

HORTICULTURAL ABSTRACTS

Vol. XVIII

September 1948

No. 3

Initialled abstracts and reviews not by Bureau staff are by J. K. Eaton and E. S. J. Hatcher of the East Malling Research Station.

INDEX OF CONTENTS.

	Nos.		Nos.	
MISCELLANEOUS	Abstr. 47.	Noted 15	1549-15960	
General	1549-1564	
Laboratory technique	1565-1573	
Practical considerations	1574-1583	
Glasshouse work	1584-1589	
Nutrition and growth substances	1590-1595	
Noted	1596a-15960	
TREE FRUITS, DECIDUOUS	Abstr. 73.	Noted 11	1597-1670k	
General	1597-1605	
Varieties and selection	1606-1620	
Propagation and rootstocks	1621-1634	
Pollination	1635-1640	
Pruning	1641-1644	
Fruit thinning	1645-1649	
Manuring and cultivation	1650-1660	
Harvesting	1661-1669	
Noted	1670a-1670k	
SMALL FRUITS, VINES AND NUTS	Abstr. 32.	Noted 6	1671-1703f	
Small fruits	1671-1688	
Vines	1689-1698	
Nuts	1699-1702	
Noted	1703a-1703f	
PLANT PROTECTION OF DECIDUOUS FRUITS	Abstr. 166.	Noted 18	1704-1870r	
General	1704-1714	
Nutritional disturbances	1715-1730	
Climatic factors	1731-1747	
Viruses	1748-1752	
Bacteria	1753-1755	
Fungi	1756-1769	
Mites and insects	1770-1807	
Weeds	1808-1820	
Vermin	1821-1824	
Sprays and spraying	1825-1836	
Fungicides	1837-1846	
Insecticides and insecticidal plants	1847-1869	
Noted	1870a-1870r	
VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS	Abstr. 185.	Noted 35	1871-2057i	
General	1871-1876	
Garden vegetables	1877-1940	
Potatoes	1941-2012	
Tobacco	2013-2031	
Other crops	2032-2055	
Noted	2056a-2057i	
FLORICULTURE	Abstr. 41.	Noted 2	2058-2099b	
SUB-TROPICAL CROPS	Abstr. 72.	Noted 1	2100-2172a	
General	2100-2102	
Citrus	2103-2135	
Avocado	2136-2149	
Tung oil	2150-2159	
Other crops	2160-2172a	
TROPICAL CROPS	Abstr. 79.	Noted 16	2173-2252p	
General	2173-2183	
Sugar cane	2184-2196	
Coffee	2197-2209	
Cacao	2210-2220	
Oil palm	2221-2226	
Fibres	2227-2229	
Bananas	2230-2235	
Papaw	2236-2239	
Rubber	2240	
Other crops	2241-2251	
Noted	2252a-2252p	
STORAGE	...	Abstr. 10.	Noted 4	2253-2263d
PROCESSING AND PLANT PRODUCTS	Abstr. 32.	Noted 18	2264-2296r	
NOTES ON BOOKS AND REPORTS	Abstr. 43.	Noted 8	2297-2340h	
Total Abstracts	780.	Noted 134.		

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

MISCELLANEOUS.

General.

1549. ANON. 31: 63(42)

Agricultural statistics—England and Wales.

Agriculture, Lond., 1948, 55: 42-5.

The figures presented include the acreage occupied by individual small fruit (6) and vegetable crops (24) and types of flower culture (3) in 1939, 1946 and 1947. The figures for the total area, in 1,000 acres, in 1939 and 1947 respectively were: Small fruit, 47.2 and 35.3; vegetables, excluding potatoes, 251 and 538.5; potatoes, 454 and 941;

flowers, excluding those grown in glasshouses, 24 and 16. Vegetable glasshouse crops covered an area of 3,300 and 3,700 acres in 1939 and 1947 respectively.

1550. AKKÖYUNLU, A. Z. 63(410) + 633.79

Büyük britanya ziraati ve teşkilatı. (*Agriculture and its organization in Great Britain*)

Tekel Enstitüleri Raporları, 1947, 5: 1-56, bibl. 21, being *Tekel Enstitüleri Yayınlarından* Ser. A, No. 6.

An account (in Turkish) of the agricultural and horticultural

research stations, agricultural colleges and bureaux, and the National Agricultural Advisory Service of Great Britain. Most of the bibliography and illustrations are concerned with hop-growing.

1551. BROWN, P. H. 634/635(427.4)

Commercial horticulture in Yorkshire.
Agriculture, Lond., 1948, 55: 179-82.

In 1947 the total of all horticultural production in Yorkshire was approximately 50,000 acres, consisting of 47,000 acres of vegetables, 2,150 acres of fruit and some minor crops. More than half of the vegetable area is taken up by peas, carrots with 5,000 acres being next in importance. Specialities are: (1) *Rhubarb*. The roots, grown on nearly 5,000 acres of the industrial area of the West Riding, are lifted when 2-3 years old and packed tightly together on the floor of a dark forcing shed, approximately 9 to the square yard. The sheds are heated and watered by hose pipe or overhead irrigation, the work being carried out by dim artificial light. Yields are about 36 lb. per square yard. It is suggested that, apart from high rainfall and the accumulated skill in the forcing practice, the smoky, polluted atmosphere accounts for the success of this industry, since it brings about early and complete dormancy which allows of early forcing. (2) *Broccoli*. This crop fits in well into the rotation with rhubarb. The carefully built up local strains have two important characteristics: lateness and well-projected curds. Harvesting takes place from late April to early June. (3) *Production under Dutch lights* was introduced into the Hull area about 1935 by a few Dutch settlers; at present this method of cultivation embraces 200 acres, the largest concentrated area of the kind in the country. The "single" cropping system, as used in Holland, has been adopted, the principal crops being lettuce, tomato, cucumber and melon. The expansion of fruit and vegetable growing, both in the open and under Dutch lights, is advocated.

1552. ANON. 631.34(42)

Progress at Wrest Park.

Fruitgrower, 1948, 105: 705-6.

An account of the new home of the National Institute of Agricultural Engineering, Silsoe, Bedfordshire, England, with particular reference to the plans of the horticultural section. Five groups are to be organized for work on vegetables, fruit, glasshouse crops and flowers, soil preparation, and horticultural liaison. The preliminary programme is outlined. Lines of research include: frost control, glasshouse heating, the control of heat loss through glass at night by the use of aluminium foil blinds, the performance of horticultural machinery, etc.

1553. HAYTER, C. N. 634.1/8(689.1)

Fruit growing possibilities of the Eastern districts of Southern Rhodesia.

Rhod. agric. J., 1948, 45: 4-8.

"In no part of the Colony are conditions so generally favourable to fruit culture as in the Eastern districts." Brief notes are given on: the best fruit country, communications, fruit quality, varieties, when to plant, planting distances, cropping, marketing, organized selling, and standardized packs. The following selection of varieties in order of ripening is given: For districts at 3,500 to 5,000 ft. a.s.l. and over [between 18° and 20° S. lat.]: *Apples*. Christmas, Lady Carrington (Alma), Delicious, Versveld, Rome Beauty, Blenheim Orange Pippin, Jonathan, Rhode Island Greening, Ohenimuri and White Winter Pearmain. *Pears*. Le Conte, Keiffer, Beurré Bosc, Packham's Triumph. At 5,000 feet and over, Clapps Favourite, Williams's Bon Chrétien, Beurré Hardy and Doyenne du Comice may also be included. *Peaches*. For 5,000 ft. and over: Bell's November, Waldo, Bell's Improved, Killiekrankie, Early Mammoth, Kakamas Cling, Mamei Ross, Early Crawford, Million Dollar (J. H. Hale). *Plums*. Apricot, Methley, Santa Rosa, Satsuma, Wickson, Kelsey. *Nectarines*. (Best

kept to 5,000 ft. range and over.) Early Rivers, Goldmine, *Apricots*. Early Cape, Alpha, *Quinces*. Meeches Prolific, Cape Selected, Champion, Bonne. *Figs*. White Genoa, Adam. *Almonds*. Britz, Jordaan, I.X.L., Paper Shell. (Plant mixed varieties for cross-pollination.) *Cherries*. (Only for over 5,000 ft.) Bing, Napoleon Bigarreau, Black Tartarian, Giant Heidelfinger. (Plant mixed varieties for cross pollination.) *Pecans*. All varieties, budded or grafted trees. *Other fruits*. Mulberries, strawberries, youngberries, Mexican apple [Casimiroa], persimmons, chestnuts, walnuts, olives. Sub-tropical fruits for districts under 5,000 ft.: *Oranges*. Washington Navel, Mediterranean Sweet, Valencia or Premier, Seville. *Grapefruit*. Triumph, Marsh's Seedless. *Lemon*. Eureka, Villa Franca, Lisbon. *Naartjes*. Old Cape, Emperor. *Avocados*. Fuerte, Itzamna, Gottfried, Collinson. *Mangoes*. Selected Seedlings. *Litchi*. Layered trees. *Guavas*. (White flesh) Parkers, Patnagola. (Pink flesh) Selected seedlings, Chinese, Strawberry or Cherry (small). *Grape vines*. Catawba and Niagra can be grown in most districts but lack flavour. Red and White Hanepoort, Alphonso Lavelle, Barlinka and Barbarossa do well some years. *Other fruits*. Limes, loquat, bananas (Cavendish in frost-free areas), pawpaws, tree tomatoes, walnuts and chestnuts (Japanese), pomegranates, pineapples, Cape gooseberries, custard apples (cherimoyer), granadillas.

1554. MARLOTH, R.H. 634.1/8(676)

Report on the potentialities of fruit-growing in Kenya.

Publ. Dep. Agric., Kenya [1947 ?], pp. 33, Shgs. 1.50.

The report is divided under four main heads: some factors affecting fruit-growing in Kenya; fruits grown, deciduous, subtropical and miscellaneous; departmental organization and administration; fruit-growing in native reserves. The author stresses the fact that success in fruit-growing does not depend merely on technical skill but in no small measure on the politics, administration and economics of a country. Argentine and Brazil, despite their knowledge that production was possible, have paid heavily in capital loss for failure to realize the importance of such factors before embarking on a rapid development of their fruit industries. Colonial Office policy, the labour shortage in Kenya, the relative standard of living of European, Asiatic and Native producers, the buying power of other countries, and the ability to meet world competition as regards quality and cost of production must all be carefully considered before any policy of large-scale development is embarked upon. There are tables showing: the acreages under fruit trees and other crops, the imports of fresh fruits and fruit trees, and meteorological data.

1555. HOWARD, W. L. (BROOKS, R. M.). 634.1/8(794)

Home fruit growing in California.

Circ. Calif. agric. Ext. Serv. 117, 1947, pp. 83, bibl. 25.

This publication deals with the wide range of temperate and sub-tropical fruits that can be grown on a small scale in various parts of California. Lists are given showing the varieties suitable for the different climatic regions.

1556. ARIZONA. 63(791)

Arizona agriculture 1948.

Bull. Ariz. agric. Exp. Stat. 211, 1948, pp. 16.

The 18th in a series of annual agricultural summaries. Includes production figures for vegetables, citrus and dates, and a map showing the irrigated areas in Arizona.

1557. SONESSON, N. 634/635(485)

Trädgårdsväxtodlingens ekonomiska betydelse inom lantshushållningen. (The significance of horticulture in Sweden's economy.)

Sver. pomol. Fören. Årsskr., 1947, 48: 5-26.

Some figures for 1946 should be of interest: Excluding

MISCELLANEOUS

potatoes, farm vegetables were grown on an area of 26,900 acres and vegetables, including potatoes, in market gardens, on 50,000 acres. Of these, about 12,300 acres were glass-houses and frames. Other areas noted are: Small fruit about 152,000 acres, nearly half of them currants, and nurseries about 1,600 acres. The number of fruit trees was 6.7 million, two-thirds of them apples. The total value of horticultural production amounted to 373 million kr., of which market gardening yielded 43% and fruit-growing 31%. The industry is capable of expansion and requires further research facilities, especially for experiments with crops under glass. In 1943 the canning industry was supplied with fruit and vegetables from 8,650 acres. If it were to expand considerably this area would be totally inadequate.

1558. PETERSEN, J. 634/635(489)

Nieuwe richtlijnen voor het tuinbouwkundig onderzoek in Denemarken. (New trends in Danish horticulture.)

Meded. Direct. Tuinb., 1948, 11: 369-73.

An account of the four horticultural research stations in Denmark, at Hornum, Spangsbjerg, Blangstedgaard and Virum, with recommendations for their further development proposed by a commission appointed by the Danish Ministry of Agriculture.

1559. HONIG, F. W. 634/635(492)

Het tuinbouwonderwijs in Nederland. (Horticultural instruction in Holland.)

Meded. Direct. Tuinb., 1948, 11: 374-80.

Indicates the courses open to horticultural students, and gives the numbers attending various courses in January 1948.

1560. ANON. 634/635(469)

Dez anos de actividade da Junta Nacional das Frutas ao serviço da nação. (Ten years' activity of the Junta Nacional das Frutas in the nation's service.)

Bol. Junta nac. Frutas, Lisbon, 1947, 7: 419-566.

A review of 10 years' work of the Portuguese National Fruit Board, 1937-1946. Fruit and vegetable growing is of great economic importance in Portugal and figures show the value of these products in the export trade of the country. The functions of the Board are set out.

1561. GÆLJ, A. G. 581.9: 551.453

Scientific work on acclimatization in deserts. [Russian.]

Priroda (Nature), 1948, No. 1, pp. 76-81.

An account is given of observations made at the Priaral experiment station of the U.S.S.R. Institute for the acclimatization of plants in desert regions. The results described deal with cereals, cucurbits and vegetables, and yields are quoted for potato, tomato, onion and water-melon under irrigation. Reference is made to growing cereals in wide rows, water-melons in hollows (3×3 m. diam.) and vegetables in trenches (1.5 m. wide at bottom, and 1.2 to 1.6 m. deep, down to the water table). The article concludes with a list of 19 publications issued by the station.

1562. GILBERTSON, H. W. 659.15

Educational exhibits, how to prepare and use them.

Misc. Publ. U.S. Dep. Agric. 634, 1948, pp. 41, bibl. 5, illus., 25 c.

This booklet is described as a manual for extension workers; in it are set out all the tricks of the showman's art, whereby the innocent visitor is attracted, held, informed, and persuaded by the exhibit. Several horticultural exhibits are illustrated.

1563. DAEPP, H. P. 41.312.1

La nomenclature des plantes. (Plant nomenclature.)

Rev. hort. suisse, 1948, 21: 162-5.

The confused state of horticultural nomenclature is discussed with special reference to Switzerland, where four languages are in use, and foreign check lists can never be satisfactory. A Swiss Plant Index is proposed.

1564. BRERLEY, W. G., AND CLARK, V. L. 631.436

Soil temperatures in summer.

Minn. Hort., 1948, 76: 84.

Graphs show the soil temperatures at a depth of 6, 12 and 18 in. of raspberry plots in two localities in Minnesota during July, August and September 1942. In the locality where raspberries, some cool-season vegetables and many perennials grow particularly well, the temperatures at all three depths were lower, but more uniform, than in the other locality.

Laboratory technique.

1565. MACKENZIE, A. J., AND DEAN, L. A. 581.192

Procedure for measurement of P^{31} and P^{33} in plant material.

Analyt. Chem., 1948, 20: 559-60, bibl. 5.

A routine quantitative procedure for determining the specific activity of plant material containing radioactive phosphorus has been successfully applied to vegetative samples from greenhouse and field experiments. By comparison of the specific activity of the fertilizer preparation with that of the plants grown on soil receiving this fertilizer, the proportion of the phosphorus contained in the plants derived from the fertilizer may be estimated. [Authors' summary.]—Bureau of Plant Industry, etc., Beltsville, Md.

1566. HOPP, R. 581.1

Internal temperatures of plants.

Proc. Amer. Soc. hort. Sci., 1947, 50: 103-8, bibl. 2.

An account of greenhouse and outdoor studies on the temperature of plant parts showing that these, particularly the fruiting organs, rise considerably above air temperature when exposed to sunshine, differences of over 20° F. above air temperature being recorded. "It appears that our conception of plant temperature in relation to the environment may have to undergo some revision. Cells or tissues have their own temperature which may be different from the air temperature during the hours of sunshine. On sunny days, weather station records tell us little about the actual temperature conditions under which plant parts function. When a tomato plant grows in soil of 70° F. while the air is 80° F., the ground surface 90° F. and the temperature inside the ripe tomato 100° F., it can hardly be said that the internal temperature of the plant is 'approximately the same as the temperature of its surroundings.'”—Univ. of New Hampshire.

1567. ARNEY, S. E. 634.75: 581.12

The respiration of strawberry leaves attached to the plant.

New Phytol., 1947, 46: 68-96, bibl. 19, illus.

The respiration of strawberry leaves over 15 min. periods was determined by measuring the CO_2 emission of single darkened leaves attached to the plant. Special absorption apparatus and leaf chambers are described and figured. The respiratory activity (expressed as c.c. of $\text{CO}_2/\text{hr./dm}^2$ of leaf area at 24.5°C.) was determined at intervals throughout the life of individual leaves. Respiration of the leaf increases rapidly during expansion to a peak value when expansion is complete; there is then a rapid fall to a level which is maintained, with only slight further decrease, until yellowing starts, when there is a slight temporary rise. All the leaves on all plants behave in exactly the same way, except the leaves produced in May and June which are much larger than the rest. These "summer" leaves have a high rate of respiration throughout life, and the initial peak is not marked as it is in other leaves.

1568. WERNER, O. 58.002 Analytik der Körperfrequenzänderungen bei dikotylen Pflanzen. Grundlagen zu einer physiologischen Methode der landwirtschaftlichen Ver suchstechnik. (The analysis of body weight changes in dicotyledons. A physiological method of experimental technique in agriculture.) *Bodenkult.*, 1947, Hft. 1, pp. 1-27, bibl. 18.

Up to now technical difficulties have prevented the utilization in nutritional studies of body weight changes in the living plant. The author devised a method of weighing the above-ground part of plants during growth by substituting the rigid root-shoot connexion by a long, thin and flexible root bridge which allows the shoot to be fixed to a balance. With monocotyledons the weight can be read directly, with dicotyledons certain additional calculations are required to eliminate errors caused by the secondary growth of the root. Experimental plants are produced in the following manner: The seedling is grown in moist soil in a small bottomless container, which is placed on top of a larger container when the root begins to show. As soon as the root has spread in the second container, watering of the first one is discontinued. As further containers are added, watering is confined to the bottom one. This drying out of the soil from top to bottom is called "plus-emancipation". The isolation of the root from dry soil presents no difficulties, and the root bridge can be exposed to the air. The greatest accuracy in weighing is achieved with a root bridge of about 1 m. length and with the shoot, in an upside-down position, fixed directly to the arm of the balance. With this arrangement errors did not exceed 0.1 g. in determining the weight of plants of 2 kg. Continuous attachment to the balance did not interfere with growth; for instance a tomato plant weighing 90.2 g. at the beginning of the experiment finally reached a weight of 5,460 g. and produced a good crop. The tabulated data on weight changes in growing tomato, *Solanum nigrum* and cabbage plants allowed the following conclusions to be drawn: (1) A nutrient solution containing nitrate very rapidly leads to a higher rate of weight increase. (2) On sunny days the minimum weight was always registered in the early forenoon. (3) The water loss of a wilting plant is restored quickly when water uptake is increased. (4) The daily rate of increase in weight is steady in young plants and unsteady in old ones.—Inst. f. Obst- u. Gartenbau, Hochschule f. Bodenkultur, Vienna.

1569. WERNER, O. 578.683 Neue Wege zur Verbesserung des Vegetations gefässes. (New methods of improving experimental plant containers.) *Bodenkult.*, 1948, Hft. 2, pp. 181-9, bibl. 3.

Two new containers are described which assure a high moisture gradient in the soil volume of experimental plants. (1) The containers used in the first study were constructed with a minimum of partition. The root system of a tomato plant had to pass through four such containers successively until the fifth and final container was reached after 3½ months. During this period the four upper containers and their soil were gradually removed, leaving a 56 cm. long bridge of bare root. The cone-shaped ball of soil at the tip of the root had an upper diameter of 19 cm. and a height of 20 cm. It stood in a glass dish which was refilled with water and nutrient solution as necessary. The plant bore a good crop. In July it was cut back and in October it was flowering and fruiting again. This shows that tomatoes may be grown satisfactorily in a small volume of soil. The unfavourable effect of pot walls is avoided, but there is no loss of water or nutrient solution. This method, a compromise between water and soil culture, is thought to offer many practical advantages. (2) For the second series of experiments wooden boxes were made, 128 cm. long and containing five compartments about 24 cm. high, 16 cm. wide and 13.5 cm. deep. The compartments are separated by ductile boards, which do not close tightly at the back but leave a V-shaped space (3.5 cm. high) for the roots to grow through. The boxes are stood up at an angle of 50°; the individual compartments are filled with soil as the root tip begins to grow into them. So far, dwarf maize, potato, East Malling apple rootstocks and sweet potato have been used in these experiments. With rootstocks it was possible to dry out the two upper compartments (= about 50 cm.) completely without affecting the development of the shoot. Potato roots grew through four compartments, of which the two top ones were dry and the two bottom ones moist when the experiment ended. The tubers (412 g.) developed in dust-dry soil. The arrangement offers the further possibility of filling different compartments with different soils.—Inst. f. Obst- u. Gartenbau, Hochschule f. Bodenkultur, Vienna.

1570. WARBURG, O. 581.13 Assimilatory quotient and photochemical yield. *Amer. J. Bot.*, 1948, 35: 194-204, bibl. 10.

New manometric measurements of the exchange ratio of CO₂ and O₂ are reported; they confirm that photosynthesis requires a minimum of four light quanta per molecule of O₂ evolved. [This is a translation of a paper received by the U.S. Military Government in Germany in 1946.]—Kaiser Wilhelm Institute for Cell Physiology, Liebenberg, Brandenburg.

1571. DENNY, F. E. 581.12 Effect upon plant respiration caused by changes in the oxygen concentration in the range immediately below that of normal air. *Contr. Boyce Thompson Inst.*, 1948, 15: 61-70, bibl. 4.

The respiration rate of potato tubers and roots of radish, beet and turnip was depressed by 5% by a reduction of O₂ concentration to 15%; at 18% O₂ no reduction was detected. With tomato fruits no change in the rate was observed with 15% O₂.

1572. BONNER, W., AND BONNER, J. 581.192: 581.11 The role of carbon dioxide in acid formation by succulent plants. *Amer. J. Bot.*, 1948, 35: 113-17, bibl. 21.

Experiments on the effects of temperature, light and the partial pressure of CO₂ on organic acid metabolism in various succulents lead the authors to suggest that the CO₂ pressure within a leaf that displays crassulacean metabolism may control the diurnal fluctuation of acid content through the direct fixation of CO₂ as organic acid.—California Institute of Technology, Pasadena.

1573. DROBKOV, A. A. 581.1: 539.16 The significance of radio-active elements in plant life. [Russian.] *Nauka i Žizn* (Science and life), 1947, No. 3, pp. 14-18.

The author discusses first the role of macro- and micro-elements in plant physiology and then the part played by radio-active elements (including potassium as feebly radioactive) in promoting plant growth. He describes, with illustrations, experiments carried out at the Vernadski Academy of Science, U.S.S.R., in which plants grown in soil, water, or sand cultures with specially purified reagents grew less vigorously than similar cultures to which traces of radio-active elements had been added. Rose, peas, cyclamen and kok saghyz were among the plants tested. The most favourable concentrations for water and sand cultures were 10⁻⁹ to 10⁻¹⁰ radium, and 10⁻⁴ to 10⁻⁵ uranium and thorium in 1 litre of culture solution or 1 kg. sand. Radio-active elements are shown also to have a stimulating effect on the root nodule organisms of leguminous plants, no nodules being formed in the complete absence of such substances. The implications of these results in biology are discussed.

Practical considerations.

1574. McMARTIN, A. 632.19
Agricultural systems and the health of crops.
S. Afr. J. Sci., 1947, 43: 66-78, bibl. 5.
 The main thesis in this paper is that "man by the very fact that he has extracted crop plants from their natural environment and grown them in fields or plantations, thus ensuring a copious food supply for the multiplication of pests and diseases, has created an unbalanced environment wherein the damage done by destructive organisms becomes more accentuated than in a natural community of plant life".

1575. SANDERS, H. G. 631.582
Rotations.
Bull. Minist. Agric., Lond. 85, 1948, pp. 18, 6d.
 A new and entirely rewritten edition of a bulletin first published in 1925. After dealing with the principles of rotations, the Norfolk 4-course rotation, and its failure on economic grounds, the author devotes the rest of the bulletin to a discussion of modification in rotation methods designed to meet modern needs.

1576. GARNETT, C. S. 631.411.4: 631.8
Humus and fertiliser facts.
North. Gdnrs., 1948, 2: 385-9.
 For the satisfactory growth of many plants in the wild humus is quite unnecessary. Seedlings of epiphytic orchids can be raised on sterile nutrients. While encouraging the use of all available humus, the writer adds a cautionary note: "The condemnation of the use of synthetic chemical substances for manurial purposes, and the advocacy of the sole use of organic waste materials is, in itself, fundamentally quite unscientific, and indicative of the widely profound lack of a sufficient knowledge of the subject. The fact that harm to the soil may have frequently resulted from the use of 'artificial manures' is—as is so readily demonstrated by their correct use—merely proof of incorrect use."

1577. HICKINBOTHAM, A. R. 631.4: 634.3 + 635.65
Soil and water.
J. Dep. Agric. S. Aust., 1948, 51: 377-8.
 The writer discusses the salt content of bore and other natural waters, and explains the points to be considered before using water of borderline salt content. Most plants will thrive for some time on water that contains 100 to 150 grains per gallon of total salts. French beans and citrus trees are more sensitive and stand only half this amount.

1578. SHAW, E. 631.67
A new soil moisturizing technique.
Soil Sci., 1948, 65: 347-8, bibl. 2.
 The method involves the addition of water as ice scorings or snow to the dry soil at -20° C. Details of the method are given, and soil studies where its application should be useful are indicated.—University of Arizona.

1579. BENTHAM, G. 631.589: 663.61
Soiless cultivation in Iraq—winter trials.
North. Gdnrs., 1947, 1: 250-4, 272-3.
 After clearing the previous summer crops of lettuce and tomato (*ibid.*, 1947, 1: 112-17, 136-8; *H.A.*, 17: 1902), the sand was sifted and thoroughly leached with clean water. Lettuce seedlings were transplanted, and Scarlet Globe radish and Early Nantes carrots sown at the end of November. The plants were protected against sun and rain by reed mats; later, when the nights became cold, glass covers were used. Radishes were harvested at the beginning of January.

1580. RHODES, A. 631.589: 663.61
A method of nutrient application for soiless culture.
Agriculture, Lond., 1948, 55: 23-5, bibl. 5.
 A description, with illustration, of a method of soiless

culture, which overcomes the need for large storage space encountered in the sub-irrigation system and the inadequate distribution inherent in the surface application method. Briefly, it consists of "gravity feeding a dilute solution to a porous tile drain laid in the bottom of the bed which contains the growing medium. By suitable slopes on the floor of the bed, the aggregate is moistened evenly, and any solution not absorbed is drained away. Ordinary 4-inch land drain tiles are cemented together and, by the provision of the inlet at the lowest and an outlet at the highest points in the main channel, air locks can be prevented and draining facilitated". The experimental plants were tomatoes, and the growing medium a type of vermiculite. The nutrient solution, containing 100 p.p.m. N, 50 p.p.m. P₂O₅ and 200 p.p.m. K₂O, was fed to the bed at a rate of 0·4 gallons per plant per day. Apart from periodic recharging of the nutrient solution reservoir the system required no further attention. A combination of the gravity feed technique with the ion-exchange resins system is envisaged as a possible future development permitting further simplification. A more detailed description may be found in *Bull. Jealott's Hill Res. Stat.* 2 (revised), 1947.

1581. LEUKEL, R. W. 631.531.17
Recent developments in seed treatment.
Bot. Rev., 1948, 14: 235-69, bibl. 173.
 The parts of this review of interest to our readers are those dealing with vegetable seeds, seed potatoes, fungicidal materials, treatment with growth substances, synergism and antagonism, and the effect of storage on treated seed. *Growth substances*—Evidence of the efficacy of treatment is inadequate, despite numerous claims. *Storage*—Injury during storage after treatment depends on length and conditions of storage, rate of application, and on variety, moisture content and condition of the seed-coat.

1582. COTTERELL, H. J. 631.531
Tetrazolium salt as a seed germination indicator.
Ann. appl. Biol., 1948, 35: 123-31.
 In staining tests with 2: 3: 5-triphenyl tetrazolium chloride on wheat, barley, oats, peas and vetches results were as reliable as actual germination. The optimum conditions for testing have been determined. Extension of the method to other seeds depends chiefly on size; smaller seeds do not allow of really detailed examination.—Research Laboratories, Messrs. May & Baker Ltd., Dagenham, Essex.

1583. KASERER, H. 631.531.17
Die Verwendung von "Porro" zur Prüfung von Saatgut. (The use of "Porro" for seed testing.)
Bodenkult., 1947, 1: 227-9.
 An account of the action of a proprietary substance "Porro" which, applied as a dust to seed, is found to increase and facilitate germination.

Glasshouse work.

(See also 1618, 1688, 1902, 1904, 2056, 2079, 2081, 2322.)

1584. SEELEY, J. G. 635.965: 631.67
Automatic watering of potted plants.
Bull. N. York St. Flower Grs 23, 1947, pp. 1-9, 12, illus.
 Three systems are described—automatic injection by flooding a bench whenever the pots become dry, constant water level with the pots standing on one inch of sand above the steady water table in a water-tight bench, and a semi-automatic system of applying water through copper tubes to the surface of sand in a bench that need not be water-tight.—Cornell University.

1585. RHODES, J. 631.544.7
Cloches and cropping.
Agriculture, Lond., 1948, 55: 10-12.
 Discusses site and soil, varied uses, strip cropping and

planning. For commercial use the type of cloche employed should not be less than 20-24 in. wide and 16-18 in. high.

1586. STUART, G. M. 631.544: 635.2

A four years' cloche-cropping trial.

Scot. Agric., 1948, 28: 51-4, illus.

The trials have shown that under Scottish conditions the cultivation of early vegetable and salad crops under the low-barn type of continuous cloche is profitable for the smallholder. For the last year of the trial, 1947, the following data are tabulated for several varieties of pea, lettuce, carrot, tomato, and cucumber: dates of sowing, germination, transplanting, cloching and decloching, first and last picking; yield per one or more 40-yard rows; market returns. Tomato plants were trained horizontally along a wire support and were not decloched. Hundredfold proving a suitable variety in view of its dwarf habit. The plants were stopped at the fourth truss. Four rows of this variety yielded over 493 lb. between 7 August and 24 September. Cucumbers were planted out about the third week in May and were stopped at the fourth true leaf. The first fruits matured on 10 July and the last were picked on 24 September. For both tomatoes and cucumbers the soil under the cloches should be scooped out to form a shallow trench, the planting distance in the row being 4 ft. The control of annual weeds was one of the greatest problems encountered. A weedock, a specially-made short-handled hoe, proved to be a useful tool for the purpose.—Edinburgh and East of Scotland College of Agriculture.

1587. LIHNELL, D. 631.544: 632.954

Kloratförgiftningar i växthus. (Chlorate poisoning of glasshouse plants.)

Växtskyddsnötiser, 1948, No. 2, pp. 18-24, illus.

Failures of tomato and flower crops in glasshouses due to chlorine poisoning are reported. The explanation is that sodium chlorate applied as a weed killer outside the glasshouses had been leached into the ground water and thus found its way into the wells used for watering. Experimental watering with a sodium chlorate solution as dilute as 0.003% was found to cause severe damage.

1588. JACKSON, A. A., AND BARKER, E. 631.544

Soil-warming tried at Wye.

Grower, 1948, 29: 773, illus.

A wooden propagating bench 62 ft. \times 4 ft., filled with peat, was warmed to some 10° F. above the glasshouse air temperature by the use of 16 units of electricity each night during the spring. Two cucumber beds 60 ft. \times 2 $\frac{1}{2}$ ft., warmed at a cost of 20 units nightly, came into production a fortnight earlier than did unheated beds.

1589. HALL, F. 631.544

Warm in winter, cool in summer.

Grower, 1948, 29: 808-9.

A grower describes his glasshouses, which he now builds in an east-west line, with the south roof making an angle of 65° with the horizontal. It is not necessary to shade these houses in summer, when they are cooler than houses orientated north and south.—Chester.

Nutrition and growth substances.

(See also 1596c, g, i, j, r, 1622, 1645, 1647, 1648, 1661, 1662, 1670c, e, f, g, k, 1811-1819, 1873, 1904, 1925, 1926, 1939, 2120, 2121, 2183, 2193, 2297.)

1590. SCHMIDT, C. M., AND OTHERS. 016: 581.192: 631.8

Boron as a plant nutrient. A bibliography of literature published and reviewed January 1941 through December 1941.

(Publ.) *Amer. Potash Inst.*, Washington, 1947, pp. 61+xvii.

This is the 4th supplement to the bibliographies "Boron as

a Plant Nutrient" issued in 1938, 1939, 1940 and 1941, which covered the literature reviewed during the period January 1936 to December 1940.

1591. SNOW, R. 577.17: 581.14

Torsions induced by auxin.

New Phytol., 1947, 46: 1-4, bibl. 3, illus.

Experiments were carried out on bean, pea, sunflower, tomato and oat seedlings. Young orthotropic stems, coleoptiles and main roots, when placed horizontally and treated on one side with hetero-auxin paste, all twist so as to raise the treated side to the top, or towards it. These torsions are not caused by curvatures in two planes which are also induced. The treated organs become plagiotropic, the treated side being physiologically dorsal.—Magdalen College, Oxford.

1592. ALCARAZ MIRA, E., AND CARIDAD IGELMO, J. M. 577.17

Estudios de hormonas vegetales. (Plant hormones.)

Bol. Inst. nac. Invest. agron. for. Madr., 1946, No. 15, pp. 49-96, bibl. 4, illus. [Summary in English and German.]

A historical review of the work on plant hormones and a consideration of the present status of the avena test.

1593. KRAMER, M., AND SILBERSCHMIDT, K. 577.17

Pesquisas acerca da determinação de hormônios vegetais em plantas da flora subtropical. (Determination of growth substances in sub-tropical plants.) [English summary 3 pp.]

Arq. Inst. Biol. São Paulo, 1946, 17: 99-148, bibl. 35, illus.

A modification of the *Avena* test is described. The seasonal distribution of auxins in various organs of several species is discussed.

1594. WARNE, L. G. G. 577.17

Plant hormones.

North. Gdn., 1948, 2: 306, 307; 3: 25, 26, 67, 68, 73, 74, 407, 408; 4: 46, 47, 65, 66.

A clear account of the properties and uses of some natural and synthetic plant growth substances.

1595. GRAY, R., AND BONNER, J. 577.17

*Structure determination and synthesis of a plant growth inhibitor, 3-acetyl-6-methoxybenzaldehyde, found in the leaves of *Encelia farinosa*.* *J. Amer. Chem. Soc.*, 1948, 70: 1249-53, bibl. 16.

The structure, determination and synthesis of a new compound, 3-acetyl-6-methoxybenzaldehyde, which was isolated from the leaves of *Encelia farinosa*, is given. The inhibitory activity of the toxic compound and other related compounds on the growth of tomato seedlings in solution culture is demonstrated. [Authors' summary.]

Noted.

1596.

a BIDER, M.

Die Sommerhitze und -dürre 1947 in Zahlen. (Heat and drought statistics of the 1947 summer in Switzerland.)

Schweiz. Z. Obst- u. Weinb., 1947, 56: 473-5. Data of the meteorological institute, Basle.

b DERMIN, H.

Histogramesis of some bud sports and variegations. *Proc. Amer. Soc. hort. Sci.*, 1947, 50: 51-73, bibl. 14, illus.

In cranberry and other plants.

c DOBIE, J. B.

Liquid manure pumps and equipment. *Circ. Calif. agric. Ext. Serv.* 140, 1947, pp. 11, illus.

d DUVDEVANI, S. 551.508.71
An optical method of dew estimation.
Quart. J. roy. met. Soc., 1947, 73: 282-93, bibl. 7.
 Full account of the method noted in *H.A.*, 17: 1116.

e HARLEY, J. L. 581.144.2
Mycorrhiza and soil ecology.
Biol. Rev., 1948, 23: 127-58, bibl. 132.

f JONES, H. E. 632.954
The influence of 2,4-dichlorophenoxyacetic acid on nitrate formation in a Prairie soil.
J. Amer. Soc. Agron., 1948, 40: 522-6, bibl. 14.

g KONINGSBERGER, V. J. 577.17
Nieuwe grocistof-onderzoeken. (Recent research on growth substances.)
Landbouwk. Tijdschr., 1948, 60: 159-64.

h LENANDER, S. E. 634/635(42+489)
 Några erfarenheter från en studieres till trädgårdsförsöksstationer i England och Danmark.) (Impressions of a visit to horticultural research stations in England and Denmark.)
Sver. pomol. Fören. Årsskr., 1947, 48: 199-213.

i MATTSON, S. 631.8
Laws of ionic exchange. III. Donnan equilibria in plant nutrition.
Ann. agric. Coll. Sweden, 1948, 17: 308-16, bibl. 4.

j NIGHTINGALE, G. T. 631.84
The nitrogen nutrition of green plants. II.*
Bot. Rev., 1948, 14: 185-221, bibl. 191, being *Misc. Pap. Pineapple Res. Inst. Hawaii* 43.

* For Part I, see *ibid.*, 1937, 3: 85-174.

k ROLL-HANSEN, J. 631.523
Blomsterbiologi og arvelighetslaere. Fra vitskaps til praksis. (Flower biology and genetics. The practical application of scientific principles.) (Publ.) *Landbrukskr. Grøndahl & Søns, Oslo*, 35, 1948, pp. 61, bibl. 15.
 A discussion of plant breeding methods with many examples taken from horticulture.

l SCARTH, G. W., LOEWY, A., AND SHAW, M. 581.11/12
Use of the infrared total absorption method for estimating the time course of photo-synthesis and transpiration.
Canad. J. Res., 1948, 26, Sec. C, pp. 94-107, bibl. 3.

m SCHRANK, A. R. 577.17
Electrical and curvature responses of the avena coleoptile to transversely applied direct current.
Plant Physiol., 1948, 23: 188-200, bibl. 15.

n TORSTENSSON, G. 631.8
Användningen av isotoper inom växtfysiologien och gödselläran. (The use of isotopes in plant physiology and fertilizing practice.)
J. roy. Swedish Acad. Agric., 1948, 87: 83-4.

o WANSCHER, J. H. 582
The interrelation of the different terms used in plant systematics.
Yearb. roy. vet. agric. Coll. Copenhagen, 1948, pp. 1-28, bibl. 24.

TREE FRUITS, DECIDUOUS.

General.

(See also 1549, 1552-1555, 1557, 1558, 1560, 1596h, 1680, 2298, 2299, 2301, 2311, 2322, 2326, 2327, 2332.)

1597. KOBEL, F. 634.1/8(439.1)
Der Obst- und Weinbau in Ungarn. (Fruit and vine growing in Hungary.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 413-17, 427-36, 445-9.

An account of a visit to the fruit and vine growing areas of Hungary. The viticultural institute in Budapest and the neighbouring experiment stations were destroyed during the war, as were also the buildings and glasshouses of the horticultural faculty in the capital. Another difficulty post-war Hungary has to contend with is the large number of new settlers who occupy the land as a result of the agrarian reform. Despite present difficulties, which include a critical situation in many vineyards, a more intensive cultivation can eventually be anticipated. Formerly fruit growing was confined to the north of the country and a few parts in the south, but to-day many plantings exist in the lowland and even in sandy soils, where irrigation is practised. It was found that well-manured trees are much the most drought-resistant. Although the average annual rainfall in the fruit regions is only 20-28 in., yields are excellent where orchards are looked after properly. Most of the fruit is grown in modern plantations of half-standard trees. With a further expected extension of industry, Hungary should soon be in a position to export fruit, and very cheaply on account of the low land and labour cost. From a discussion of the individual fruit kinds the following points may be mentioned: *Apples*. Codling moth is the chief enemy, but mildew is also important, while scale has little significance. Seedling rootstocks are prevalent, but M. IV is popular for bush trees because of the deep penetration of its roots. The climate is too dry for pears.

Cherries. There are many new plantings of sweet cherries worked on *Prunus mahaleb*. Acid cherries are grown in the east. *Apricots* are worked mainly on seedling rootstocks, though St. Julien is also used. Concern is caused by a die-back of limbs or whole trees, the nature of which has not been determined. *Verticillium* and *Valsa* spp. may be partly responsible. *Peach* culture, carried on south-west of Budapest on warm calcareous soils and around Lake Balaton, is highly developed, the rootstocks being exclusively high standard almond seedlings. The centre for the promotion of *walnut* growing is the agricultural college and future research station at Esterházi, where many new varieties have been produced. The grafting technique employed is very similar to that developed at Wädenswil, but in view of the cold winters *Juglans nigra* has to be used as the rootstock instead of *J. regia*. The *almond* area largely coincides with that of the peach, the trees being grown as half-standards. *Viticulture.* Table grapes are an important industry, also for export, and much breeding work is in progress. Several white wines are of excellent quality. The wine-making processes need modernizing. In well-run orchards the San José scale is under control, but a new DDT- and arsenic-resistant pest of the *mulberry*, the fall webworm (*Hyphantria cunea*), recently introduced from America, threatens the silk industry with extinction.

1598. KESSLER, H. 634.11 + 634.13 + 634.8
Ein unveröffentlichtes Bilderwerk über Apfel-, Birnen- und Traubensorten aus den Jahren 1831-34. (An unpublished collection of water colours of apple, pear, and vine varieties by Dr. Caspar Tobias Zollikofer in 1831-34.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 161-5.
 Three water colours and one variety description are reproduced: the present-day value of the collection is emphasized.

TREE FRUITS, DECIDUOUS

1599. MAURON, P. 634.1/2(445)
La région fruitière de St-Martin d'Auxigny (Cher). (The fruit-growing region of St-Martin d'Auxigny.)
Prog. agric. vitic., 1948, 129: 81-4; 100-5.
This account of a fruit-growing region in the Department of Cher, in central France, includes a description of the apple variety Cravert, which is grown on a large scale in this region.

1600. HAVIS, L. 634.23
Growing cherries east of the Rocky Mountains.
Fmrs' Bull. U.S. Dep. Agric. 776, 1948, pp. 30, illus.
General directions are given for cherry growing. Varieties and rootstocks are discussed. Considerable space is devoted to planting and pruning, and to the control of pests and diseases.

1601. GERRITSEN, C. J. 634.23(493)
De teelt van kersen in België. (Cherry growing in Belgium.)
Meded. Direct. Tuinb., 1948, 11: 406-19.
Cherry growing in Belgium is described and compared with that in Holland. An account is given of yields, cultivation (soil, planting, pruning, manuring, disease control measures, crop, sales, prices and varieties). Fifteen of the chief varieties are listed (with notes) in order of ripening, and 19 others of less importance are also noted. The fruits of 9 varieties are illustrated.

1602. BUSH, R. 634.25
Peaches no hardier than the more tender plums.
Grower, 1948, 29: 774-5, illus.
BROOKE, J.
English peach orchards.
Grower, 1948, 29: 807.
A discussion of the possibility of growing bush peaches in England. Peach cultivation in the south of France is described. Mr. Brooke, a successful peach grower (see *H.A.*, 17: 1085), contends that Early Alexander, Duke of York, Peregrine and Belgarde are hardier than the Victoria plum in Suffolk.

1603. MCVAY, F. E. 634.25
Sampling methods applied to estimating numbers of commercial orchards in a commercial peach area.
J. Amer. statist. Soc., 1947, 42: 533-40, bibl. 2.
The enumeration of sample segments containing specified numbers of farms, as indicated by road maps, was an inefficient method of estimating numbers of commercial orchards in a commercial peach area. The single-farm sampling unit was much more efficient.—University of N. Carolina.

1604. CRUESS, W. V. 634.63
Observations on olives and olive research.
Fruit Prod. J., 1948, 27: 253-6, 269.
Brief notes on the cultivation and processing of olives in Spain, France, Italy and Egypt are followed by a summary of research on olive products by the Food Technology Division of the University of California.

1605. NETTO, I. D'O. C., AND VIDAL, V. A. C. 634.64 + 665.327.3
Contribuição para o estudo do azeite português. (Portuguese olive oils.)
Rev. agron. Lisbon, 1944, 32: 4: 36-43, bibl. 13 [received 1948].
The varieties of olive grown in the oil-producing regions of Portugal are indicated. The characteristic features of olive oils of these regions are set out, and their physical and chemical characters are tabulated.

1606. ANON. 634.11: 663.3
Recommended varieties of cider apples.
Agriculture, Lond., 1948, 55: 113-16.
A short list drawn up by a representative committee is presented of recommended cider apple varieties in three main groups—Sharps, Sweets, and Bitter-sweets. Blossoming and harvesting time is indicated, and the characters of each variety are noted. In two tables the varieties are further grouped according to whether they are recommended for general planting or for a particular area. In view of the high number of acid sorts present in cider orchards to-day plantings for the time being should, on the whole, be confined to the sweet and bittersweet varieties.

1607. BRADFORD, F. C. 634.11: 663.3
Have you considered growing beverage apples?
Amer. Fr. Gr., 1948, 68: 5: 17, 36-8.
A discussion of the possibilities of growing cider apples in the United States.

1608. EINSET, J., AND IMHOFE, B. 575.252: 634.11
Chromosome numbers of apple varieties and sports.
Proc. Amer. Soc. hort. Sci., 1947, 50: 45-50, bibl. 16, illus., being *J. Pap. 697, N. York St. agric. Exp. Stat.*, Geneva.
A report on cytological studies carried out with (1) some apple varieties not previously reported in literature, (2) certain varieties about which discrepancies occurred in reports, and (3) sports, especially large-fruited ones.

1609. GREEN, F. M. 634.11(788)
Apple varieties for the Western Slope [Colorado].
Colo Fm. Bull., 1946, 8: 1: 6-11, illus.
Notes on apple varieties and sports tested at the Western Slope Fruit Substation, Austin, Colo.

1610. BRIERLEY, W. G. 634.11-1.52
The clustering habit in Haralson, Minjon and Wealthy apples.
Proc. Amer. Soc. hort. Sci., 1947, 50: 17-20, illus., being *Pap. Sci. J. Ser. 2349, Minn. agric. Exp. Stat.*
Clustering, or multiple set, is one of the undesirable characters of some newer apple varieties, such as Haralson and Minjon. This paper records the results of a study of multiple set in these two varieties compared with the old variety, Wealthy, which also has a reputation for clustering, so that fruit thinning is commonly practised where it is grown. The results are tabulated and the effects of heavy and light fruit set, age of tree and variety-habit are discussed.—Univ. of Minnesota.

1611. DE SONNAVILLE, P. 634.11-1.523
Lombarts-Calville [apple variety].
Fruittelt, 1948, 38: 331, illus.
A description of the tree and fruit of Lombarts-Calville, with a table showing its characters compared with those of Boskoop, Jonathan, and Golden Delicious. Its susceptibility to canker is low, to brown rot and mildew rather low, to scab rather high, but scab is easily controlled for the variety is somewhat resistant to spray injury. It is suitable for permanent trees of moderate size on vigorous rootstocks such as M. XVI, XIII and XI. It comes into bearing early and crops well, and so may be used for fillers on M. IV, VII, II and I. On M. IX it is also suitable as a filler but only on good soil.

1612. GARDNER, V. R., TOENES, W., AND GIEFEL, M. 634.11: 575.252
Segregation in a radially unsymmetrical sport of the Canada Red apple.
J. agric. Res., 1948, 76: 241-55, bibl. 11.
An irregular, radially unsymmetrical bud sport of the Canada

TREE FRUITS, DECIDUOUS

Red apple and its vegetative progeny are described. Some of the progeny (grafts and whole trees) resemble the parent; others show segregation of parental characters. One seems worthy of introduction as a new or improved strain of the variety.

1613. GARDNER, V. R., AND OTHERS. 634.11: 575.252
Variability and segregation in the Golden Russet apple.

J. agric. Res., 1948, 76: 231-40, bibl. 6, being
J. Art. 884, Mich. agric. Exp. Stat.

Large differences in amount of russetting from year to year are due to climatic influences. There is great diversity in russetting in any one season on individual trees and branches. Fruits grown on trees propagated from selected Golden Russet limbs showed (1) varying diversity with individual trees, (2) differences that were more or less constant from year to year in individual trees. The data suggest that the Golden Russet apple is a chimera.

1614. GARDNER, V. R., TOENJES, W., AND GIEFEL, M. 634.11: 575.252

Segregation in russeted sports of the Grimes apple.
J. agric. R., 1948, 76: 225-9.

The characteristics of daughter trees propagated from russeted limb sports of two Grimes apple trees are described. Some of these daughter trees showed reversion to the normal smooth parental type. Others showed segregation in respect to amount or percentage of russetting. These segregates exhibited a marked degree of permanence or fixity of type. Certain trees produced individual limbs showing similar reversion and segregation. Some practical implications of these characteristics of sporting forms are pointed out. [Authors' summary.]

1615. DARROW, G. M., AND OTHERS.

634.11: 575.252

The nature of giant apple sports and their use in breeding.

J. Hered., 1948, 39: 45-51, bibl. 12, illus.

Giant apple sports should be investigated intensively in a search for forms producing diploid pollen; these might be of value in the production of new triploid seedlings.

1616. SALONIUS, A.-L. 634.13-1.523

Undersökningar rörande avkomman av den triploida päronsorten greve Moltke. (Investigations into the origin of the triploid pear variety Greve Moltke.) [English summary.]
Sver. pomol. Fören. Arsskr., 1947, 48: 106-14, bibl. 17.

In the progeny of the triploid pear variety, Greve Moltke, chromosome counts were made and other characters were also studied. The main results were: 1. Among 100 fixed seedlings 7 diploids, 4 tetraploids and 1 pentaploid were found. 2. The aneuploid numbers were more frequent within the limits 35-48 and 61-76 than between these figures. 3. From measurements of stomata the means were found to be 34.0 ± 0.37 (7 diploids), 36.2 ± 0.39 (4 tetraploids) and 39.7 ± 0.50 (1 pentaploid). 4. Some morphological observations were made, which seem to be of some importance for the practical breeding work. [Author's summary.]—Balsgård research station.

1617. AUBERT, P. 634.13-1.523

Rendements de quelques variétés de poires.
(Yields of some pear varieties.)

Rev. romande Agric. Vitic., 1948, 4: 44-5.

Two individuals each of 42 varieties were planted on quince stocks in 1927. Since they were trained as espaliers with variation in size according to vigour, their yields are given as mean annual production per sq. m. of ground. In general, the more vigorous varieties and those bearing large fruits were not particularly fruitful. The regular bearers were the most fruitful.—Lausanne.

1618. HUYSMAN, N. 634.22-1.544
Een en ander over kaspruimen. (Greenhouse plums.)

Fruitteelt, 1948, 38: 343.

Notes on the varieties of plums most suitable for cultivation under glass, with particular reference to June Blood, the earliest and a good pollinator, Golden Japan, the main variety which crops well if suitably pollinated, and Ontario, which is fruitful, setting its fruit with little difficulty.

1619. BLAHA, J. 634.23: 664.85.035.5

Vhodnost některých odrůd třešní ku přípravě kompotů. (The suitability of cherry varieties for preserves.) [Summary in French (½ p.) and Russian.]

Ann. Acad. tchécosl. Agric., 1946, 19: 46-53.

The preparation and evaluation of cherry jams are described. Of 27 cherry varieties tested, 5 (named) were selected as being most suitable. Six others were fairly good. Cherries unripe or with low sugar content are unsuitable for jam making. Most Moravian varieties are very suitable.

1620. WEINBERGER, J. H. 634.25

The Dixired, Dixiem, and Southland peaches.
Circ. U.S. Dep. Agric. 766, 1948, pp. 7.

Three new early peach varieties are described; they were selected at Fort Valley, Ga. Southland is more resistant to delayed foliation and can be grown farther south than the other varieties. All are of better quality than the principal early peaches now grown.

Propagation and rootstocks.

(See also 1569, 2297, 2301, 2309, 2326.)

1621. WARING, J. H., AND HILBORN, M. T. 634.11: 631.541

Budding and grafting apple trees.

Bull. Ext. Serv. Me Coll. Agric. 356, 1947, pp. 16, illus.

The standard methods are described. Extensive framework is proposed in Maine to combat the deer menace and to reduce losses when winter killing occurs.

1622. SIAENS, F. 634.14-1.541.11

De vermenigvuldiging van kwee-onderstammen.
(The propagation of quince rootstocks.)

Cultuur Hand., 1948, 14: 162-3.

In setting out quince propagation beds, layering (with earthing) is preferable to stooling, for it produces more shoots and the mother plant is less liable to frost damage. Heeled cuttings, about 18 cm. long, give good results with quince A; they can be taken from trees cut back after grafting. The rooting of winter cuttings can be improved by the use of growth substances.

1623. RANDHAWA, G. S. 631.541.11: 634.13+634.14

Identification of pear and quince rootstocks from root-pieces.

Proc. Amer. Soc. hort. Sci., 1947, 50: 199.

The tests described concern: colour of surface bark and inner bark, general growth habit of roots, and colour reaction of inner bark to various chemicals. Of the four chemicals mentioned, sodium hydroxide (conc.) is preferred. On quince root this gave an ochraceous-salmon reaction turning to vinaceous-tawny after some time, while on pear root the colour produced was lemon yellow turning to xanthine orange later (colours from Ridgways Standards and Nomenclature).—Ontario Agric. Coll.

1624. KOVÁČEVIĆ, I. 581.14: 634.11-1.541.11

Die Abhängigkeit der generativen von der vegetativen Entwicklung des Apfels in Bezug auf den Sorten-, Unterlagen- und Standorteinfluss. (The influence of the vegetative on the generative development of apples, with reference to the varietal, rootstock and locality effect.)

Kühn Arch., 1944, 61: 1-106, bibl. 74 [received 1948].

In the course of this investigation 945 half-standard apple trees were studied in three localities in central Germany during the first eight years after planting. The following rootstocks and scion varieties were used: M. I., II., IV., V., VII., IX., XI., XVI., Beauty of Bath, Barlepsch, Boskoop, Cox's Orange, and Ontario. Of the many observations recorded and conclusions drawn, only the more generally important can be summarized here: (1) A full description is given of the influence of the above-mentioned M. clones on the vegetative growth of the five varieties during the period 1935-42 and on their flower and fruit production during the period 1941-42. (2) In the vegetative sphere the greatest influence is exerted on elongation growth and on secondary growth of the stem, the least on the circumference of the top. (3) Although the genetical constitution of the variety is a more potent factor than the modifying effect of the rootstock, rootstock influence on flower formation and fruit production was clearly definable as a separate factor, distinct from the effects of locality and climate. This is evident from the number of flower clusters needed by trees of the same variety on different rootstocks to produce 1 kg. of fully matured fruit. In the mean of all varieties, trees on M. IV., for instance, required 11.52 clusters for the production of 1 kg. apples as compared with 28.62 needed in the average by varieties on M. V. in the same year and in the same place. (4) Where the rootstock had a strong influence on vegetative growth, it showed the same tendency in the generative phase. (5) Calculations have shown that in trials of this kind data from 9 trees will yield reliable results. Consequently, to allow for losses, 12-15 trees should be planted per experimental unit. (6) It is suggested that the statistical methods used in this investigation, the analysis of variance and the correlation coefficient, should be more generally applied in the study of such complex problems as pruning and manuring of fruit trees.

1625. PASSECKER, F. 581.14: 634.11-1.541.11
Entwicklungsphasen und vegetative Vermehrung holziger Gewächse. (Developmental phases and vegetative propagation of woody plants.)
Reprinted from *Zbl. ges. Forst- u. Holzwirtsch.*, 1945 (?), 70: 270-92, bibl. 19, illus. [received 1948].

The ground of this paper has been partly covered by the author's earlier article in *Gartenbauwiss.*, 1944, 18: 219-30 [*H.A.*, 14: 1505]. New points made include the following: Like an animal the tree undergoes metamorphosis in its development, but unlike an animal, where the metamorphosis affects the whole body, the latest phase manifests itself only in the new growth, so that the adult tree retains its juvenile and transitional phases, throughout its life, in the basal parts of the stem and oldest limbs. The ready rooting of shoots, achieved in the stooling method of propagation, is explained by the origin of the shoots from the base of the stem which continues to develop juvenile growth. New data give further evidence of the difference in rooting capacity of cuttings from juvenile and mature forms of the same tree species. Cuttings of mature trees of M. III and IX apple rootstocks had formed no roots 10 weeks after planting, while roots developed on 50% and 35% respectively of the cuttings taken from the same clones in the juvenile stage. In many cases the tree in its juvenile phase produces leaves of a shape different from that in the mature phase. A long table of apple seedlings of different origin and a shorter list of pear seedlings indicate the tendency to lobe formation of the leaf in young trees. Moreover, leaves formed in the juvenile phase have a typical structure, that of a shade leaf adapted to the special ecological conditions of a young tree in a wood. Data presented relate to leaf thickness, width of the vein mesh, length of veins and number of stomata per square mm. of leaf surface in young and old trees. Shoots of older trees are further characterized by their more vigorous and compact

growth. Hence a variety (mature phase) is always used for stem builders, the seedling (juvenile phase—with the exception of cherry) being not sufficiently vigorous. The significance of the juvenile phase for the vegetative propagation of woody plants is again emphasized.

1626. FRITZSCHE, R. 581.14: 634.11: 634.13
Untersuchungen über die Jugendformen des Apfel- und Birnbaumes und ihre Konsequenzen für die Unterlagen- und Sortenzüchtung. (The juvenile forms of apple and pear trees and their bearing on rootstock and variety breeding.)
Reprinted from *Ber. schweiz. bot. Ges.*, 1948, 58: 207-67, bibl. 46.

It is shown that young apple and pear seedlings exhibit the characters of a juvenile phase which differs materially from the adult tree. The chief differences are: (1) Growing habit. In the juvenile phase, the lateral shoots branch off at a right- or even an obtuse-angle; they are rigid and often formed prematurely, as opposed to shoots in the adult phase which are acute-angled, more elastic and less subject to premature formation. Further differences are found in the bark, the buds, date of bud burst, leaf surface, leaf serration and leaf size. (2) Anatomy. The wood is more strongly developed in the juvenile and the bark in the mature phase. The wood of the former contains fewer vessels and these are concentrated in the wood formed in spring, while the later-formed part of the annual ring consists mainly of wood fibres. (3) Chemical composition. The content of reducing sugars and of starch is very considerably higher in the wood of adult trees. Also nitrogen compounds and mineral substances have been found in larger quantities in the wood of mature trees, while juvenile wood has a higher cellulose and lignin content.

In apple trees the juvenile phase has an approximate duration of 5 years and in pear trees of 7 years. In this stage the trees are completely sterile, as ringing and other trials have shown. Apparently the small number of vascular bundles, sieve tubes and storage cells are insufficient to accumulate the quantity of reserve materials necessary for flower formation. Buds on spurs, which would normally be flower buds, do not develop but tend to form spikes. If a shoot is grafted, it remains in the juvenile phase until it has reached its proper age for transition into the mature stage. The vegetative propagation of seedlings in the juvenile phase by the stooling method was found to present no difficulties, while shoots issuing from the mature zone never became rooted. Rooting in juvenile cuttings was induced in a small percentage only, which equalled, however, that obtained with cuttings from East Malling clones. It is suggested that special characters of the juvenile form are due to the influence of one or more phytohormones. As a result of these findings the Wädenswil Research Station has adopted the following method of testing seedlings in their winter apple breeding work: The one-year-old seedlings are planted closely in the nursery and left there for 4-5 years. The top shoot is then worked on a spindle bush tree for closer examination. Thus the vegetative character of the juvenile form cannot be confused with that of the mature variety. In the course of this breeding work records have been made of thousands of seedlings, many of which may have potentialities as rootstocks for standard trees. Promising seedlings are propagated vegetatively by stooling and are thus preserved in the juvenile phase, as are the clonal rootstocks.—Wädenswil Research Station.

1627. GAYFORD, G. W. 631.541.11: 634.1/2+634.51
Rootstocks for deciduous fruit trees [in Australia].
J. Dep. Agric. Vict., 1948, 46: 181-2, 189, illus.

Notes on the present rootstock situation in Victoria for apple, pear, peach, plum, almond, apricot, cherry and walnut.

TREE FRUITS, DECIDUOUS

1628. REIMER, C. 634.1/2(485)
Fruktträdssuppdragning under krigsåren. (The raising of fruit trees [in Sweden] during the war.) *Sver. pomol. Fören. Årsskr.*, 1947, 48: 27-47, bibl. 5.

Among other data, the annual growth made by a considerable number of fruit varieties is tabulated. A comparison of the records from apple varieties budded at Alnarp in 1931 and 1944 on imported and locally raised seedlings respectively shows that the trees worked on Swedish rootstocks (seed obtained from apple juice manufacturers) are superior to those worked on French seedling rootstocks, both in vigour and quality. Of about one million apple rootstocks planted out in 1946 in Swedish nurseries, 83·4% were seedlings, 10·9% M. IV, 2% M. IX and 3·7% other clonal rootstocks.

1629. ANON. 634.1/2-1.541.11
Het zaaien van fruitbomen voor onderstammen. (Raising fruit trees from seed for rootstocks.) *Cultuur Hand.*, 1948, 14: 37-40, 105-6.

After reference to the influence of the East Malling investigations on vegetative propagation of fruit-tree rootstock varieties, the author, though he does not encourage the use of seedlings as rootstocks, writes the present article for those who may be interested in it. A brief account is given of the stratification of seeds and the transplanting of seedlings, and seedling rootstocks for plum, cherry and peach are discussed.

1630. AMELINCKX, F. 634.1/2-1.541.11
Het zaaien van wildelingen voor onderstammen. (Seedlings as rootstocks.) *Cultuur Hand.*, 1948, 14: 232-3, bibl. 6.

The author criticizes a previous anonymous article (abstr. 1629) on the use of seedlings as rootstocks. He points out the confusion that exists in nomenclature and the importance of knowing the precise identity of the plant used as a source of seed. This is discussed in relation to a number of species and varieties of *Prunus*.

1631. MAURER, K. J. 631.541.11: 634.11
Das Sämlingsunterlagenproblem in der Praxis. (The problem of seedling rootstocks.) *Schweiz. Z. Obst- u. Weinb.*, 1948, 57: 201-5.

The author, who is now at the Geisenheim research station in Germany, confines himself to half-standard and standard trees, on which most of the German apple crop is produced. He considers East Malling rootstocks, with the exception of M. XVI on light dry soils in mild situations, unsuitable.

1632. WARING, J. H., AND HILBORN, M. T. 634.11-1.541.11
Hardy stocks in the apple orchard. *Bull. Ext. Serv. Me Coll. Agric.* 355, 1947, pp. 15.

An account of the use of hardy intermediates, such as Hibernal and Virginia Crab, to reduce winter damage in the apple orchard.

1633. NILSSON, F., AND OLDÉN, E. 634.11-1.541.11
Updragnings av nya äpplegrundstammar. (The selection of apple rootstocks.) [English summary ½ p.] *Sver. pomol. Fören. Årsskr.*, 1947, 48: 87-105, bibl. 6.

During the period 1942-47 the selection and breeding of clonal apple rootstocks has been one of the chief objects of the Balsgård research station. In the first instance, the capacity for forming adventitious roots was tested in large numbers of seedlings by earthing them up in the nursery. Where the origin of the seed was known, it was found that adventitious root formation is a varietal character, the varieties Flädie, Maglemer and Mank's Codling yielding a comparatively high percentage of plants with this faculty. The two last-named were therefore also used for breeding.

Further crosses were carried out with M. IX, *Malus baccata*, White Transparent and Säfstaholm as parents. Of the 700 seedlings selected in 1942 for their good rooting capacity 6 were retained, having proved hardy and disease-resistant. A test of these is now in progress with Ingrid Marie as the scion variety. Of 50,000 seedlings planted out in 1943 ten remain under observation, and are described as very promising.

1634. ADAMSON, N. J. 634.11-1.541.11
Replacement of apple trees on Moutere Hills orchards [New Zealand]. *N.Z. J. Agric.*, 1948, 76: 356-7, illus.

On the replacement of trees that have reached the age when they are no longer profitable. The influence of rootstocks and their effect on production are described.

Pollination.

1635. VAN MOORT, J. G. J. 634.1/2: 581.162.3
Enige aantekeningen over het kruisen van pit- en steenvruchten. (Notes on crossing pome and stone fruits.) *Meded. Direct. Tuinb.*, 1948, 11: 260-2.

It is possible to obtain a satisfactory percentage of cross-fertilization in fruit trees by simple methods. Pure pollen can be obtained from cut branches, and differences in blossoming times can be bridged. Details of the method are given.

1636. BULLOCK, R. M. 581.162.3
Is artificial pollination practical? *Amer. Fr. Gr.*, 1948, 68: 5: 14-15, 36.

Hand-pollination of self-sterile apples is both practical and effective. One acre can be hand-pollinated in 40 to 50 man-hours, and thinning can be reduced by skilful operators. No other method is satisfactory at present.—Washington State College.

1637. ECKERT, J. E. 638.12: 581.162.3
Beeckeeping in California. *Circ. Calif. agric. Ext. Serv.* 100, 1947, pp. 95, bibl. 13, illus.

This basic manual discusses the value of bees for pollination, and measures to protect them from harmful insecticides.

1638. MOMMERS, F. A. M. 581.162.3: 638.13
Over het aandeel van de honingbijen in de bestuiving van het fruit. (The part played by honey-bees in pollination of fruit blossom.) [English summary 12 l.] *Meded. Direct. Tuinb.*, 1948, 11: 252-9.

The number and kinds of insects visiting fruit blossoms at three distances from the apiary in an orchard were recorded throughout a number of days in May. One-third of the insects were honey-bees, the rest mainly flies. Most pollinations were due to honey-bees. At a distance of 290 m. from the apiary the bees were much fewer than close by, although the weather was fine. It is therefore considered advisable to divide the colonies into two or three and have them at different places in the orchard.

1639. TILLSON, A. H. 634.23-1.541.11: 581.162.3
Blossom bud differentiation and embryo development in *Prunus mahaleb*. *Proc. Amer. Soc. hort. Sci.*, 1947, 50: 219-23, bibl. 3, illus.

A record and discussion of the results from a study of blossom initiation and development undertaken as part of a study of pollination processes in different strains of Mahaleb cherry used as rootstocks.—U.S.D.A., Glen Dale, Md.

1640. WELLINGTON, R. 581.162.3: 634.1/2
Pollination the secret of fruit set. *Amer. Fr. Gr.*, 1948, 68: 5: 13, 26, 28.

While indicating unfruitful combinations of top fruits the

writer stresses two points—climate affects the problem, and named varieties are not always identical in different parts of the world.

Pruning.

(See also 1670a.)

1641. JANS, J. 634.1/2-1.542
Einheitlichkeit im Kronenaufbau. (Uniformity
in the building up of fruit trees.)

Schweiz. Z. Obst- u. Weinb., 1947, 56: 449-60.

This is a well-illustrated presentation of the Oeschberg method of pruning fruit trees, showing incidentally that the technique of tying down lateral shoots [as carried out with spindle bushes, *H.A.*, 16: 76] is partly employed in the build-up of the tops of standard trees.

1642. JOHANSSON, E. 634.11: 631.542
Beskärningsförsök med äpple vid Alnarp
1938-1947. (Pruning trials with apples at Alnarp
1938-1947.) [English summary 1½ pp.]
Meddel. Statens Trädgårdsförs. 42, from reprint
Arsskr. Alnarps Lantbr.-Mejeri-Trädgårdsinst.,
1947, pp. 209-28, bibl. 13.

The trials were carried out with apple trees of 7 varieties on M. II, III and VI rootstocks, planted in 1937. A comparison of the following treatments was made: (a) normal winter and summer pruning; (b) severe winter pruning (to 3 buds); (c) light winter pruning (to 4-5 buds in the first few years, later to 8 buds); (d) Lorette pruning. The figures for increase in stem diameter (in mm.) in the varieties Mère de Ménage (vigorous), Belle de Boskoop and Laxton's Superb, under the above treatments were: (a) 98, 100, 80; (b) 79, 114 (largest diameter of all trees), 81; (c) 92, 92, 54; (d) 87, 95, 40. Sketches illustrate the size and shape of trees of 3 varieties after 10 years under each of the 4 pruning treatments. With all 7 varieties the Lorette method produced the smallest trees. The more severely pruned trees came into bearing later than the lightly pruned ones, and the treatments (a) and (c) gave higher yields than (b) and (d). Total yields in kg. for Mère de Ménage, Belle de Boskoop and Laxton's Superb were: (a) 120, 108, 134; (b) 54, 75, 89; (c) 158, 130, 122; (d) 87, 71, 88. Differences were less pronounced in the less vigorous varieties Sävstaholm and White Transparent. In Mère de Ménage, Belle de Boskoop and Laxton's Superb the average weight (in g.) of the individual fruits varied thus: (a) 205, 190, 124; (b) 203, 199, 138; (c) 218, 209, 111; (d) 211, 194, 102. Lorette pruning therefore did not increase fruit size. Fruit colour developed best in trees treated according to (a) and (d). Hard winter pruning was found to increase bitter pit in susceptible varieties. The general conclusion is that under Swedish conditions normal winter and summer pruning or light winter pruning should be recommended to the grower.

1643. KOBEL, F. 634.1/2-1.542
Eine obstbauliche Grundfrage. (A fundamental
problem in fruit growing.)

Schweiz. Z. Obst- u. Weinb., 1948, 57: 17-19.

The method of fruit tree cultivation preferred by the Swiss is that of standard trees in sod. Rainfall in central Switzerland is nearly double that in the apple growing areas of England, so that heavy soils are dependent on evaporation by cover crops, especially grass. Secondly, the standard tree is a necessity for climatic and technical reasons. The author contends that standard trees—given the right treatment, as provided by the Oeschberg method of pruning—are capable of producing a high percentage of quality fruit.

1644. HAYTER, C. N. 634.25
Early blossoming of peach trees.

Rhod. Fmr., 26th May, 1948.

The sub-tropical peach varieties grown in Southern Rhodesia

often flower during April and May, but the crop is produced by the main blossoming which takes place in June or July. Instructions are given for annual pruning and for the rejuvenation of neglected trees.

Fruit thinning.

1645. HOFFMAN, M. B. 634.11-1.542.14
Here are the facts on blossom thinning.
Amer. Fr. Gr., 1948, 68: 4: 21, 44-5, 55.

A good account for the grower of the use of chemical sprays for thinning apple blossom. The success of sprays for thinning at, or soon after, blossoming depends on the variety and the pollination facilities. On Wealthy and Baldwin the lateral flowers can be destroyed on the first day of full bloom without damaging the central flower in each spur; but with such varieties as McIntosh, Cortland, N.W. Greening, R.I. Greening, Delicious and Northern Spy it is not possible to decide when enough pollination has occurred. App-L-Set, a preparation of *a*-naphthaleneacetic acid, appears to be less harmful than Elgetol and DN No. 1, but at present local small-scale experiments should precede the extensive use of these chemicals.—Cornell.

1646. SALTER, R. M. 634.11-1.542.14
Progress in fruit thinning with chemicals.
Report of the Administrator of Agricultural Research 1947, Bur. Pl. Industry, Soils and agric. Engng., U.S.D.A., Wash., 1948, p. 278.

In apple trees sprayed at full bloom with Elgetol the labour of hand thinning was greatly reduced or made unnecessary in some varieties. With one application of Elgetol (1 quart per 100 gallons of water) at full bloom, about half the desired thinning was obtained on Golden Delicious and Jonathan, while two applications made 24 or 48 hours apart gave almost ideal results. Delicious and Winesap trees with heavy bloom were not overthinned with a single application of 1½ pints per 100 gallons. In all experimental blocks the treatments resulted in marked increase in ultimate fruit size and in a marked tendency to reduction of biennial habit in Golden Delicious. This method of thinning cannot yet be recommended to growers.

1647. HOFFMAN, M. B. 634.11-1.542.14
Experiences in the chemical thinning of apples.
Proc. 93rd Ann. Meet. N. York St. hort. Soc.
1948, pp. 122-30, bibl. 2.

A consideration of the chemicals showing promise, the nature of their action and some results obtained in 1947. Two types of material are under investigation: the DN preparation Elgetol and DN No. 1, and a preparation containing the sodium salt of naphthaleneacetic acid, NaNAA, sold as App-L-Set. Tables show the effects of these thinning sprays on fruit set, yield and fruit-size of treated apple trees, compared with controls. Unfavourable conditions are described in which the application of App-L-Set reduced the set of apples excessively. No recommendations are made.

1648. MURNEEK, A. E., AND HIBBARD, A. D. 634.25-1.542.14
Investigations on thinning of peaches by means of caustic and "hormone" sprays.
Proc. Amer. Soc. hort. Sci., 1947, 50: 206-8,
bibl. 3, being *J. Ser. 1044 Dep. Hort., Mo. agric. Exp. Stat.*

A record of tests carried out during 1945-46 in S.E. Missouri using Elgetol (sodium salt of dinitro-ortho-cresol) and commercial "preharvest spray" (sodium salt of naphthaleneacetic acid). Results are tabulated. "A possibly interesting feature of the effects of pre-harvest sprays (NA) would seem to be that they may either reduce or stimulate fruit setting depending on the time when the application is made in relation to flower development, more specifically

to pollination and fertilization. Note should be taken here of the interesting fact that when pre-harvest sprays at 30 p.p.m. were applied during warm weather to young Jonathan and Winesap [apple] trees 7 to 9 days after full bloom there was a striking reduction in fruit set. This would seem to indicate a very marked sensitivity of flowers during sexual reproduction and early stage of embryo development to naphthaleneacetic acid and possibly other synthetic plant growth substances. It might be at least one of the reasons for the erratic results that one frequently obtains when growth substances are used to stimulate fruit setting."

1649. SPOOR, P. A. 634.25-1.542.14

Het vruchtdunnen van perziken onder glas.
(Thinning glasshouse peaches.)

Fruiteelt, 1948, 38: 297, illus.

The need for thinning glasshouse peaches to obtain good size and quality is indicated. Thinning can be done from about a month after fruit set to a month before picking. Early is preferable to late thinning. One fruit is generally advised for short spurs, 2 or at most 3 for longer shoots, the number depending on the soil, variety, age, vigour and size of tree.

Manuring and cultivation.

1650. FRITZSCHE, R. 634.1/2-1.8

Die Düngung der Obstbäume. (The manuring of fruit trees.)

Schweiz. Z. Obst- u. Weinb., 1948, 57: 56-9.

A plea for the use of the fertilizer lance for fruit trees in sod. Two ways are suggested for estimating the amount of 10% liquid solution required. (1) Determine the soil area under the spread of the branches and apply 1 litre per m²; or (2) measure the circumference of the trunk at breast height and apply 1 litre for each cm. of semi-circumference. In the case of a middle-sized tree the volume arrived at by either method will be 40-60 litres (about 9-13 gallons) and in the case of a large tree 60-90 litres (about 13-20 gallons). For moderately vigorous, heavily bearing trees a 10% solution of the following composition is recommended: superphosphate, 2 parts; ammonium nitrate, 4 parts, or ammonium sulphate, 3 parts; and a 30% potassium salt, 3 parts. A ready-mixed liquid fertilizer for injection purposes is now commercially produced in Switzerland.

1651. SIMON, G. 634.1/2-1.8

La fertilisation des arbres fruitiers au pal injecteur. (Manuring fruit trees by soil injection.)

Fruit belge, 1948, 16: 89-91, illus.

An account of soil injection with fertilizers, the injecting lances being operated from a truck (illustrated). The technique of injection and the quantities of fertilizers used are described.

1652. BOYNTON, D. 631.84: 634.1/2

Recent developments in nitrogen fertilizers and ways of applying them to orchards.

Proc. 93rd Ann. Meet. N. York St. hort. Soc., 1948, pp. 110-13.

Three developments are mentioned: the use of (1) ammonia gas, from cylinders, injected into irrigation water, or the soil; (2) nitrogen solutions (ammonia liquor, ammonium nitrate solution, ammonium nitrate solution saturated or supersaturated with ammonia); and (3) urea sprays. The first-named development would probably be useful only in peach and cherry orchards or vineyards under clean cultivation, while the second will probably not be used extensively unless there is a price advantage or a shortage of granular material. The use of urea sprays may help to solve certain problems connected with biennial bearing, fruit colour and quality.

1653. SZAKÁTSY, J. 634.11-1.55-1.8

Die Sicherstellung ständiger Erträge bei Apfelbäumen. (How to ensure annual cropping of apples.)

Schweiz. Z. Obst- u. Weinb., 1948, 57: 4-7, 19-24.

The author, a successful Hungarian grower, reports on his large-scale attempts to overcome the biennial bearing habit in apples under characteristic Hungarian conditions. The soil is brown sand, interspersed with sandy loam on a subsoil of sandy marl. The trees are standards on seedling rootstocks with a top consisting of 3 tiers 1-2 m. apart, with (starting from the bottom) 5, 4 and 3 limbs respectively. It was found that the trouble does not occur in well-balanced adult trees. A correct balance can only be maintained by annual fertilizer applications made with due regard to the requirements in a particular season, and heavier applications at greater intervals are bound to upset it and to promote the biennial habit. In order to estimate fertilizer needs the author introduced the theoretical "bearing tree unit" (Ertragsbaumeinheit), i.e. a 12-15-year-old apple tree on seedling rootstock bearing an average annual crop of at least 100 kg. (about 5½ bushels) and requiring a spray volume of about 2½ gallons for one application. Thus, a 20-25-year-old tree would count as two tree units, three 8-year-old bush trees on East Malling V rootstock would correspond to one unit, etc. In 1939 for instance, the fertilizer applied per tree unit—partly in February, partly in May—amounted in kilogrammes to 1·6 nitrogen, 0·8 phosphoric acid and 2·4 potash. Records for 1938-1944, relating to 3,800-8,620 tree units, show that variation in yield was moderate, excepting in frost and hail years: 1938 (May frost), 58·4 kg.; 1939, 120·2; 1940 (hail), 69·9; 1941 (hail), 79·9; 1942, 125·0; 1943 (slight hail), 137·3; 1944, 147·4; average 105·4 kg. per tree unit. 70% of the trees were of the Jonathan variety.

1654. SPRENGER, A. M., AND TER KUILE, J.

634.11-1.8

Bemesting bij Jonathan. (Manuring the Jonathan apple.)

Fruiteelt, 1948, 38: 340-1, illus.

An account of the behaviour of Jonathan apple trees during 1947 at the central fruit manorial trial field "De Lange Ossekampen". An outstanding feature of the year was a severe June fruit drop, probably the result of deficient soil moisture. From the crop results of the plots it appears that the quality of the fruit was improved with increased N, that phosphate had no noticeable effect, that increased K had a pronounced favourable effect, and that increased lime was unfavourable.

1655. BATES, J. C., AND PICKETT, W. F. 634.11-1.84

Some effects of ammonium sulphate and wettable sulphur on apple leaves.

Proc. Amer. Soc. hort. Sci., 1947, 50: 74-80, bibl. 3, being *Contr. 215 Dep. Hort., Kansas agric. Exp. Stat.*

A study of a combination treatment of N fertilizer and wettable sulphur foliage spray, which in an earlier experiment brought about an increase in the R value (ratio of internally exposed surface to external surface) of apple leaves.

1656. CARRANTE, V.

634.63-1.8

Un quadriennio di concimazione dell'olivo in clima arido (1943-1946). (Four years' olive manorial experiments under arid conditions.) [English summary 12 lines.]

Pubbl. Staz. sper. Fruttic. Agrumic., Acireale 3 (1948 ?), pp. 45-81.

Oil yields were increased by the addition of certain manures to 70-year-old olive trees, but such a practice would not be economical unless oil prices were 500 lire per kg. or more. Fertilizer applications giving the best results were mineral superphosphate 2·4 kg. per tree covering an area of 42 square

metres, sulphate of ammonia 5·9 kg., sulphate of potash 2·15 kg., and farmyard manure 37·4 kg.

1657. STARK, A. L., AND THORNE, D. W. 634.25-1.8
Peach orchard soil management studies.
Bull. Utah agric. Exp. Stat. 330, 1948, pp. 27, bibl. 13.

Analysis of five years' yields from two manurial trials in peach orchards in Utah, in which two cover crops were compared with clean cultivation, shows that the application of nitrogenous manures tends to advance the date of harvest and to increase the crop. The cultivation of cover crops is recommended on general grounds.

1658. BOISCHOT, P., BARBIER, G., AND HÉBERT, J. 633.529.4

Sur la valeur humique de la tourbe. (The humic value of turf.)

C.R. Acad. Agric. Fr., 1948, 34: 214-17.

The authors do not agree that peat (which is used in quantity in certain Swiss orchards) has the same physical and biological effect on soil, as dung, green manuring and other decomposable vegetable matter.

1659. GOOSEN, R. J. 634.1/2-1.875
Lupins for the improvement of orchard soils [in S. Africa].

Fmg S. Afr., 1948, 23: 160-4, illus.
Lupins have contributed much towards solving the fertilizer problem in orchard soils of the Langkloof area. Photographs are reproduced illustrating the need for inoculating soils in this area before sowing lupins.

1660. LATIMER, L. P., AND PERCIVAL, G. P. 634.11-1.87

Comparative value of sawdust, hay, and seaweed as mulch for apple trees.

Proc. Amer. Soc. hort. Sci., 1947, 50: 23-30, bibl. 5.

A progress report on an experiment, the design of which was described in an earlier paper together with the first year's results (see *H.A.*, 14: 1521). All data were analysed statistically. The main conclusions reached were that in the absence of fertilizer application, hay mulch provided nearly ideal conditions for tree development and performance and seaweed took second place. Sawdust mulch provided excellent conditions of soil moisture, but yield and tree growth were reduced and the foliage was pale in colour. Sod culture [i.e. grass cut] without additional mulch provided the least satisfactory condition as reflected in the very low yield of trees grown under this system, and in the comparative failure of these trees to produce fruit buds.—Univ. of New Hampshire.

Harvesting.

1661. HARLEY, C. P., MOON, H. H., AND REGEIMBAL, L. O. 634.11; 577.17

Further studies on sprays containing 2,4-dichlorophenoxyacetic acid, and some related compounds, for reducing harvest drop of apple.

Proc. Amer. Soc. hort. Sci., 1947, 50: 38-44, bibl. 3, illus.

Preharvest sprays containing 10 parts per million of 2,4-dichlorophenoxyacetic acid have for two consecutive years shown high intensity and a long period of effectiveness in reducing harvest drop of Stayman Winesap and Winesap apples. Some salts and esters of 2,4-dichlorophenoxyacetic acid were highly effective in reducing fruit drop. The butyl ester showed the highest intensity, but this compound caused serious advance in fruit maturity at harvest. Combined with a late-summer bordeaux spray, the effectiveness of 2,4-D acid was apparently somewhat reduced. A laboratory test to evaluate varietal response to 2,4-D acid is described. [From authors' summary.]

1662. VAN CAUWENBERGHE, E. 634.1: 577.17
L'emploi des hormones contre la chute prématuée des pommes et des poires. (The use of hormones to control pre-harvest drop in apples and pears.)

Fruit belge, 1948, 16: 81-4.

The results of the trials described were somewhat variable, depending on the variety and species (apples or pears) and on the product used. On the whole apples reacted better than pears. Combinations of certain hormones give better results than if they are used separately.

1663. BERGGREN, Å. 634.1-1.55: 581.036

Några fruktsorters plockningstid vid Alnarpsträdgårdar 1927-1946. Ett försök till klarrättande av temperaturernas inverkan på plocknings-tiden. (The dates of harvesting certain fruit varieties in the Alnarp plantations 1927-1946. An attempt to elucidate the influence of temperature on the date of harvesting.)

Sver. pomol. Fören. Årsskr., 1947, 48: 71-80.

Graphs are presented for 4 apple and 5 pear varieties showing both the date of harvesting and the summer temperature for the two 10-year periods 1927-36 and 1937-46. The average picking dates were, for Cox's Orange 1927-36, 4th October; 1937-46, 10th October; for Cox's Pomona, 1927-36, 26th September; 1937-46, 23rd September; for Doyenné du Comice, 1927-36, 8th October. With apple and pear varieties maturing in August and September, May and June temperatures appear to have the greatest influence on the date of harvesting, but for pears maturing in September the July temperature was found to be of at least equal importance. The date of harvesting of apple and pear varieties maturing in October was chiefly determined by August and September temperatures, though the temperatures of earlier months cannot be disregarded.

1664. POST, J. J. 634.1/7: 581.14

Phaenologisch onderzoek bij fruitgewassen in 1947. (Phenological investigation on fruit trees in 1947.)

Meded. Direct. Tuinb., 1948, 11: 196-9.

Phenological data (e.g. dates of flowering and of harvest of observations on fruit trees in Holland were collated and are here presented as maps.)

1665. LEE, F. A., AND OBERLE, G. D. 634.1/2-1.547.6

The use of the tenderometer for the determination of the firmness of apples, peaches and pears.

Fruit Prod. J., 1948, 27: 244-6, bibl. 12, being

J. Pap. N. York St. agric. Exp. Stat. 754.

The tenderometer may be used to determine the harvesting date of pears, peaches and apples. The pressure tester and the tenderometer gave very similar results with apples.

1666. FJÄDERHANE, A. M., AND TINGDAL, C. J. 634.1/2-1.55

Kan fruktördörden rationaliseras? Orienterande arbetstidsstudier. (Can the fruit harvest be rationalized? A preliminary study of labour efficiency.)

Sver. pomol. Fören. Årsskr., 1947, 48: 116-30.

An analysis is made of the time spent on the different harvesting operations, such as picking various apple and pear varieties, grading and packing. For each operation the performance per hour has been worked out. Piece work seemed to be preferable to time work both from the grower's and from the labourer's point of view.

1667. BAILEY, C. M. 634.11-1.55

Harvesting apples without boxes.

Proc. Ann. Meet. N. York St. hort. Soc. 1948, pp. 228-31, illus.

A description of a method using tractor-drawn, 2-wheeled

box trailers holding about 40 bushels each, into which apples are loaded in the orchard direct from the pickers' bags and transported to the packing house about half a mile away. The fruit is transferred from trailer to grader by raising the trailer, with a small electric hoist, to an angle of 30° and allowing the apples to flow out of the tailgate through a controllable gate of soft foam rubber.

1668. HORTICULTURE DIVISION, N.Z. FRUITGROWERS FEDERATION. 634.11

Synopsis of grading standards for apples.

Orchard. N.Z., 1948, 21, No. 2, Supplement, 1 p.

A clearly-printed chart showing the minimum colour requirements for New Zealand-grown apples, and the maximum allowances of blemishes in the 4 grades.

1669. B., C. 634.1/2-1.55-1.3

Une invention fort simple, mais pratique. (A simple and practical tree support.)

Rev. hort. suisse, 1948, 21: 143, illus.

A patented fruit tree support consists of an aluminium mast placed close to the trunk. Up to 16 galvanized iron cables pass over a ring at the top of the mast, each supporting a branch by means of a strap. A horizontal disc is fixed to the mast at 6 ft. above the ground; the lower end of each cable has a number of equally-spaced stops, and tension is adjusted by passing the cable into a radial slot in the disc so that this holds the appropriate stop.

Noted.

1670.

a ANAGNOSTOPOULOS, P. T. 631.542: 634.1/8

The influence of pruning on the fruiting of fruit trees. [Greek, English summary 2 pp.] (*Publ. Univ. Thessalonika*, 1940, pp. 86, bibl. 5, illus. [received 1947].)

b BORGSTRÖM, G. 634.1(82)(83)

Fruktodlingen i Argentina och Chile med särskild hänsyn till produktionen av äpplen och päron. (Fruit growing in Argentina and Chile, with special reference to apple and pear production.)

Sver. pomol. Fören. Årsskr., 1947, 48: 159-85, illus.

- c BURRELL, A. B. 634.11: 577.17
Drop-prevention spray holds apples despite later frost injury to leaves.
Proc. 93rd Ann. Meet. N. York St. hort. Soc. 1948, pp. 107-9.
- d DUCHENE, F. 634.13-1.546
La culture fruitière en basses-tiges. Etude du poirier (pyramides-fuseaux) en basses-tiges. (Fruit trees on short stems. Spindle bush pears.) *Fruit belge*, 1948, 16: 84-8.
- e VAN GELUWE, J. D. 634.11: 577.17
Observations in preventing pre-harvest drop of apples.
Proc. 93rd Ann. Meet. N. York St. hort. Soc. 1948, pp. 190-3.
- f HOFFMAN, M. B. 634.1: 577.17
Use of hormones for drop prevention.
Proc. 93rd Ann. Meet. N. York St. hort. Soc. 1948, pp. 113-17.
- g HOWARD, W. E. 634.1: 577.17: 656.7
Hormone drop prevention by airplane application.
Proc. 93rd Ann. Meet. N. York St. hort. Soc. 1948, pp. 189-90.
- h KOBEL, F. 634.1/2-1.542.27
Das Ausplücken als Mittel zur Verhinderung der Alternanz. (Fruit thinning to control biennial bearing.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 182.
- i LUNDBLAD, K. 634.1/8-1.811
Spårämnens betydelse för frukt- och bärödlingen. (The significance of trace elements for top and small fruit growing.)
Sver. pomol. Fören. Årsskr., 1947, 48: 48-56.
- j MATTSSON, K. 634.1/2(485)
Fruktodling i Norrländsbygder. (Top fruit growing in northern Sweden.)
Sver. pomol. Fören. Årsskr., 1947, 48: 140-3.
- k WARD, W. T. 632.95: 656.7
Results of hormone applications from airplanes, ground dusting and spraying.
Proc. 93rd Ann. Meet. N. York St. hort. Soc. 1948, pp. 118-22.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(See also 1564, 1567, 1680, 1703b, e, 2302, 2324, 2328, 2337.)

1671. BLAHA, J., AND HANZELKA, F. 634.7: 581.192

Chemické složení lesních plodů a polovoce. (The chemical composition of woodland fruits and of berries.) [Summary in English and Russian.] (*Ann. Acad. tchécosl. Agric.*, 1946, 19: 276-80.)

The importance of investigating the chemical composition of fruits for processing is pointed out, and analyses of a number of berries and wild fruits are tabulated. Particular attention is given to vitamin C content and dry matter.

1672. LOWDEN, E. 634.711(71)

Raspberry varieties [in Canada].
Canad. Gr., 1948, 71: 6-7, 24.

The special requirements, merits and demerits of 18 raspberry varieties under Canadian conditions are discussed. The author believes that Ottawa 263 has not yet found the recognition due to this remarkably early variety.

1673. JOHANSSON, E. 634.711(485)

Mitra och Miranda—Två nya svenska hallonsorter. (Mitra and Miranda—Two new Swedish raspberry varieties.) [English summary 4 p.] (*Sver. pomol. Fören. Årsskr.*, 1947, 48: 131-9, bibl. 7.)

Descriptions and illustrations are given of two new raspberry varieties raised at Alnarp by the author and C. G. Dahl. Mitra arose from a cross between Pyne's Royal and Superlative, and Miranda from a cross between Marlborough and Pyne's Royal. In tests carried out in four different places Miranda outyielded all varieties and Mitra was superior to the old varieties. The figures for a three-year trial at Tosemarken, for instance, are in kg. per 100 m²: Marlborough, 43; Superlative, 23; St. Walfrid, 31; Miranda, 58; Mitra, 46. Both of the new varieties are less susceptible to virus disease than the old varieties, they are winter-hardy in southern Sweden, are not affected by an alkaline soil reaction, and are of good dessert quality. Mitra, which is said to travel well, has a vitamin C content of 23 mg./100 g., Miranda one of 26 mg./100 g.

1674. TRULLINGER, R. W. 634.711

New raspberry.

Report of the Administrator of Agricultural Research 1947, Office Exp. Stats., U.S.D.A., Wash., 1948, pp. 354, 355, 60 cents.

At the Washington station breeding for hardiness and disease resistance has resulted in several new red raspberries, one of which, Washington (Cuthbert × Lloyd George), proved outstanding, a measured acre yielding over 9 tons.

SMALL FRUITS, VINES AND NUTS

1675. SNYDER, J. C. 634.711
Cane fruit culture explained.
Better Fruit, 1948, 42: 11: 9-10, 32-4, 36-8.
 Directions are given for the cultivation of red and black raspberries in Washington and Oregon, and the principal varieties are described.

1676. HOGG, D. J. 634.71(931)
Boysenberry culture in Nelson Central.
N.Z. J. Agric., 1948, 76: 363-4, illus.
 Propagation, supporting, manuring, harvesting and spraying are all considered. The boysenberry may be propagated by layering, root cuttings and tip layers. The tip layer method, commonly used by commercial growers, is carried out by burying the tips of the current season's vines in the late summer or autumn. The tips should be rooted and ready for cutting from the main vines in the following spring. The main diseases and pests of boysenberries are raspberry bud moth, blister mite, leaf roller, cane spot and cane wilt.

1677. BAILEY, S. A. 634.715: 664.85.715.037
New blackberry good for freezing.
Better Fruit, 1948, 42: 10: 28.
 Chehalem, a cross between Santiam and Himalaya, has been released from the Oregon State College Experiment Station. The fruit retains its shape, colour and flavour when frozen.

1678. OLDFHAM, C. H. 634.726
Modern cultural methods [for gooseberries].
Fruitgrower, 1948, 105: 533-4.
 Directions are given for the propagation, planting, manuring, cultivation and pruning of gooseberries. Choice of site is important, as young fruit may be damaged by late frosts. Symptoms of K and Mg deficiency are described.

1679. YARBROUGH, J. A., AND MORROW, E. B. 634.73: 581.47
Stone cells in *Vaccinium*.
Proc. Amer. Soc. hort. Sci., 1947, 50: 224-8, bibl. 13, illus., being *Pap. 263, J. Ser. Dep. Hort., N. C. agric. Exp. Stat.*
 A comparison of fruit structure in *Vaccinium ashei* with that of *V. altmontanum*, *V. constabaei*, *V. tenellum* and *V. australe* (hort. vars. Rubel and Dixi). True stone cells occur in the fleshy mesocarp of all these species in varying degree. The results are discussed. It would seem possible to breed horticultural varieties free from stone cells.

1680. MAINE. 634.1/8(741)
Fruits.
 Reprinted from *Bull. Me agric. Exp. Stat.* 449, 1947, pp. 405-35, bibl. 6.
Blueberries.—Work is reported on pests, propagation by seeds and cuttings, soils and fertilizers. 2,4-D gives good control of some weeds of blueberry fields, particularly after burning, but it also affects the blueberry plants. *Apples.*—Progress in the control of pests and diseases has been reported elsewhere. Statistical analysis of growth measurements showed that most of the variation in tree size was due to scion variety; it does not seem possible to predict yield from intermediate trunk diameter. Sawmill by-products are being tested as mulch in a manurial trial.

1681. SCHWARTZE, C. D., AND MYHRE, A. S. 634.734: 631.535
Rooting blueberry cuttings.
Bull. Wash. agric. Exp. Stat. 488, 1947, pp. 32, bibl. 21, illus.
 Cuttings rooted satisfactorily in a mixture of peat and sand, 3 : 1 by volume, in sash-covered beds in lath houses. Bottom heat at 70° F., supplied by electricity, made a profitable improvement in the rooting of hardwood cuttings set in March. In June softwood cuttings rooted well without bottom heat, heel cuttings generally showing better development than straight cuttings. Growth substances tried were without value.

1682. OLDFHAM, C. H. 634.75-1.523
The new strawberry varieties.
Fruitgrower, 1948, 105: 624-5, 651-2.
 An account of the methods and results achieved in breeding strawberries at the Cambridge Horticultural Research Station. Features of some of the 1,500 seedlings now being tested are indicated.

1683. DARROW, G. M., AND WALDO, G. F. 634.75(73)
Strawberry varieties in the United States.
Fnrs' Bull. U.S. Dep. Agric. 1043, 1948, pp. 30, illus.
 The principal varieties now being cultivated are tabulated by states and districts, and notes are given of varieties suitable for special purposes, e.g. for climatic extremes, for canning or shipping. Although some varieties have remained in cultivation for 50 years, new varieties are being raised and from time to time the best of these may displace some of the older sorts. Twenty-eight varieties are described.

1684. HARTMANN, H. T. 634.75: 581.036.1
The influence of temperature on the photoperiodic response of several strawberry varieties grown under controlled environment conditions.
Proc. Amer. Soc. hort. Sci., 1947, 50: 243-5, bibl. 6.
 The coastal strawberry districts just south of San Francisco give some of the highest known strawberry yields because, in addition to the usual spring crop, there are harvests throughout summer and fall. An investigation is reported from which it seems that this summer production of fruit is probably a result of the low mean temperature during the summer months which causes floral initiation in spite of the long days.—Univ. of California.

1685. VISSER, W. C. 634.75-1.432
De eisen van aardbeien ten aanzien van de diepte van het grondwater. (The demands of strawberries on the soil water-table.) [English summary & p.]
Meded. Direct. Tuinb., 1948, 11: 351-5.
 The solution of the drainage problem in Dutch sandy soils is linked with broad shallow waterways, as indicated by trials with strawberries. Graphs show that there is a rapid decrease in yield if the level of the ground water drops below 1 metre—the best results may be expected at a depth of 70 cm.—and that yield depends largely on the fluctuation of the water-level (difference between highest and lowest levels). “Keep the water-table low” should be supplemented with, if not replaced by, “keep the water-table stable”.

1686. DARROW, G. M., AND SCOTT, D. H. 634.75-1.523
Breeding for cold hardiness of strawberry flowers.
Proc. Amer. Soc. hort. Sci., 1947, 50: 239-42, bibl. 4.
 Selections of the meadow strawberry, *Fragaria virginiana*, show great differences in flower and bud hardiness to frost, some being far more hardy than any cultivated varieties. Selections having frost-resistant flowers, when crossed with the cultivated variety Midland, transmitted frost resistance in a high degree to their seedlings. [Authors' summary.]—U.S. Plant Ind. Stat., Beltsville, Md.

1687. LINEBERRY, R. A., AND COLLINS, E. R. 634.75: 631.8
Fertilizing strawberries in North Carolina.
Bull. N.C. agric. Exp. Stat. 332, 1942, pp. 20, bibl. 21 [received 1948].
 A 5-7-5 or 4-8-4 neutral or basic fertilizer should be applied annually, half late in summer, the balance in winter. Additional applications of nitrogen in spring increased yield but delayed ripening and lowered keeping quality. Very acid soils should be limed.

SMALL FRUITS, VINES AND NUTS

1688. CHEAL, W. E. 634.75-1.544
An experiment on forcing two-year-old strawberry plants under cloches.
Gdnrs' Chron., 1948, 123: 208-9.
 After the very severe winter of 1946-47, cloches were applied to some plants in the middle of March, to others in April, local practice being to cover the plants in mid-February. On Malling 40 Royal Sovereign strawberries covered by barn cloches in March, fruit was ripe a fortnight earlier than on the uncovered plants, which produced a greater proportion of second-grade fruit. Tent cloches cramped the plants.—N.A.A.S. hort. exp. Stat., Botley, Hampshire.

Vines.

(See also 1703a, c, d, f.)

1689. MALAN, A. H. 634.8
Hanepoot grapes [in S. Africa].
Fmg S. Afr., 1948, 23: 107-17, bibl. 2, illus.
 This variety has a delicate muscat flavour and is usually preferred in S. Africa to other table grapes. It does not travel well and is somewhat exacting in its climatic and soil requirements, thriving in dry, hot areas, on deep loamy soils under irrigation. Advice is given on choice of soil, selection of scions and rootstocks, pruning, topping, removal of suckers, fruit thinning, training, irrigation and the control of fungus diseases.—W. Prov. Fruit Res. Stat., Stellenbosch, S. Africa.

1690. DEARING, C. 634.848
New muscadine grapes [*Vitis rotundifolia*].
Circ. U.S. Dep. Agric. 769, 1948, pp. 28, bibl. 1, illus.
 Fifteen new muscadine varieties are described. Six are hermaphrodite, and of these at least three are self-fertile. All are remarkably resistant to pests and diseases.

1691. FENNELL, J. L. 634.8-1.523
Inheritance studies with the tropical grape.
J. Hered., 1948, 39: 54-64, bibl. 8, illus.
 Studies of hybrids between *Vitis* spp. of temperate and tropical origin. Problems of disease resistance and climatic adaptation are discussed.

1692. DESFLASSIEUX, A. 634.872
Quarante années d'expérience sur les raisins de table. (Forty years' experience of growing table grapes.)
Rev. hort. Paris, 1948, 120: 99-104.
 An account of the establishment and upkeep of a vineyard of table grapes, with a discussion of the better varieties.

1693. FRANÇOT, P., AND MAURO, J. 634.8-1.542
Recherches raisonnées sur les différences de sorties observées en Champagne en 1947 suivant les systèmes de taille. (A rational study of the differences of bud-burst observed in Champagne in 1947 in relation to pruning systems.)
Prog. agric. vitic., 1948, 129: 44-56.
 The authors consider, from their own observations and those of other workers, that a close relation exists between the temperature of the surrounding air and the development of the inflorescences within the vine buds as they appear successively along the branches and until after flowering. They state that experimental confirmation is required, however, and describe a technique for that purpose. Observations of methods of pruning and training vines in Champagne are described.

1694. KAZRA, D. 634.8-1.541
Le greffage herbacé de la vigne en Hongrie. (Soft wood grafting of the vine in Hungary.)
Prog. agric. vitic., 1948, 129: 339-43, illus.
 Soft wood grafting of vines as employed in Hungary is useful for replacements and for top-grafting "direct

producers". It is important to choose graft shoots at the right stage of development. They should not be too soft, or they will easily flag, and if lignification has started union will be difficult. The methods in general use are cleft, "simple English" and saddle grafting.

1695. FUSIGNANI, J. 634.8-1.535
Urine et enracinement des porte-greffes américains. (Urine for rooting American rootstocks.)
Prog. agric. vitic., 1948, 129: 25-9.
 The results recorded show that good results in rooting cuttings of two rootstock varieties of vine were obtained by immersing them in a mixture of cattle urine one-third, water two-thirds, for 24 or 48 hours.

1696. ALDERFER, R. B., AND FLEMING, H. K. 634.8-1.4
Soil factors influencing grape production on well-drained lake terrace areas.
Bull. Pa agric. Exp. Stat. 495, 1948, pp. 24, bibl. 22, illus.
 The effect of various properties of the surface soil on the yield and weight of prunings of Concord vines was studied in three vineyards. Soil organic matter and total nitrogen content, available moisture capacity, capillary porosity, clay and silt content, and total exchange capacity were each positively correlated with growth and yield. There was no direct relation of production to non-capillary porosity and pH. Differences in the surface soil could often be attributed to erosion. On lake terrace soil the growth and yield of Concord vines are likely to be affected by practices which affect the characteristics of the surface soil. [From authors' summary.]

1697. PEYER, E. 634.8-1.512
Eine praktische Neuerung bei der mechanischen Bodenbearbeitung. (A practical innovation in vineyard cultivation equipment.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 146.
 A device is illustrated by means of which the plough can be released from the towing chain when it is in danger of injuring a vine.

1698. FLANZY, M. 663.25: 581.192: 634.8
Les acides organiques dans les raisins et les vins. (Organic acids in grapes and wines.)
Ann. agron. Paris, 1948, 18: 60-4, bibl. 6.
 Variations in the tartar index do not necessarily depend upon meteorological conditions.

Nuts.

1699. FREW, S. 634.51
The culture of walnut trees.
N.Z. J. Agric., 1948, 76: 281-4, illus.
 The main supply of walnuts in New Zealand comes from old trees of doubtful origin, and the introduction of known good varieties is advocated. Species and varieties, propagation, cultivation, pruning, harvesting, and the control of bacteriosis (*Bacterium juglandis*) are discussed.

1700. DE LA SERRE, G., AND MARION, J. P. 634.53
Le châtaignier et sa culture de rapport. (Growing the sweet chestnut tree.)
Société de Reboisement en Châtaigniers, Brive, 1945, pp. 52, bibl. 15, illus.
 Printed on paper made of chestnut wood, this booklet is intended to encourage planting, replanting and rehabilitation of chestnut groves in France. Details of grafting are given and the principal varieties are described.

1701. HOROŠIH, P. P. 633.68
A rare plant of Narym. [Russian.]
Priroda (Nature), 1948, No. 2, pp. 60-1, bibl. 2.
 The water-chestnut (*Trapa natans*) is recorded for Narym

in the Tomsk province of western Siberia. The characters, habit and distribution of the plant are described.

1702. VASILJEV, V. N. 633.68
Instructions for collecting herbarium specimens of the water-chestnut. [Russian.]
Priroda (Nature), 1948, No. 2, pp. 61-2.

This article discusses *Trapa natans* as an interesting flowering plant, which has survived from cretaceous times. Its fruits (nuts) are nutritious, containing starch and proteids, and the plant is cultivated in eastern countries (India, China, Japan) as a source of food; in some parts of India the kernels are used in making bread and cakes. It is suggested that it could be cultivated profitably in Russia and a plea is made for a more intensive study of the biology of this plant. The characters that warrant special examination and description are indicated.—Botanical Institute, Komarov Academy of Science, Leningrad.

Noted.

1703.
a DEGRULLY, L. 634.8-1.8
Formules de fumure pour les vignes. (Formulae for vine fertilizers.)
Prog. agric. vitic., 1948, 129: 74-8.
Thirteen formulae for vine fertilizer mixtures.

PLANT PROTECTION OF DECIDUOUS FRUITS.

General.

(See also 2308, 2311, 2312, 2316, 2317, 2336.)

1704. SCHLUMBERGER, O. 632.1/9(43)
Der Pflanzenschutz in Deutschland nach dem Zusammenbruch. (Plant protection in Germany after the collapse.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 3-4.

The President of the Biologische Zentralanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, discusses the present position of the German plant protection service, which is again run on the old lines. Irrespective of zones of occupation, the service is allowed to function as a whole for the entire country, its headquarters being at Berlin-Dahlem [American sector of Berlin]. For the time being the efficient control of pests and diseases is hampered by lack of chemicals and equipment. Sanitary measures and breeding for resistance will therefore have to play an important part in keeping crops healthy.

1705. BERAN, F. 632.1/9(436)
Pflanzenschutz in Österreich. (Plant protection in Austria.)
PflSchütz Ber., 1947, 1: 2-5.

The reorganization of the plant protection service in Austria by the "Bundesanstalt für Pflanzenschutz" is described. From 1938 to 1945 the Service functioned as a branch of the "Biologische Reichsanstalt", Berlin-Dahlem. Colorado beetle, San José scale and the plum and cherry pest, *Tropinota hirta* Poda (*Oxyrhyncha funesta* Poda) are named among the pests of greatest practical significance. The diseases particularly demanding attention include die-back of apricots, potato wilt and bacterial wilt of tomatoes.

1706. TOMASZEWSKI, W. 632.97
Gegenwartssprobleme der Pflanzenquarantäne. (Problems of plant quarantine to-day.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 62-6.

In contrast to the developments in the field of protective chemicals little progress has been made in the international organization of plant quarantine since the first world war. A plan for the reorganization of the German plant quarantine service is submitted.

b FILINGER, G. A. 634.7(781)
Growing bush fruits in Kansas.
Circ. Kans. agric. Exp. Stat. 239, 1947, pp. 31, being *Contr. Dep. Hort.* 212.
Especially raspberries and blackberries.

c GALLAY, R., BENVENGIN, L., AND LEVYRAZ, H. 634.8-1.521
Problèmes relatifs à l'encépagement du vignoble romand. (The choice of varieties for the vineyard in French Switzerland.)
Rev. romande Agric. Vitic., 1948, 4: 36-8, 42-4, 52-4.

d HÜNI, A. 634.8(494)
Die Produktionskosten im Weinbau. (The costs of production in [Swiss] viticulture.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 168-71, 184-7.

e LILJEBLAD, A. 634.7(485)
Bärödning i Norrland. (Small fruit growing in northern Sweden.)
Sver. pomol. Fören. Årsskr., 1947, 48: 144-7.

f NISWONGER, H. R., AND WILLIAMS, C. F. 634.848
Muscadine grape culture.
Ext. Circ. N.C. agric. Exp. Stat. 306, 1948, pp. 7.

1707. DIRECTIE VAN DE LANDBOUW. 632.9
Middelen tegen plantenziekten en schadelijke dieren. (Control measures against plant diseases and pests.)
Meded. PlZiekt. Dienst, Wageningen 43, 1948, 45 pp.

A review of chemicals and proprietary preparations in present-day use against plant diseases and pests, discussed under (1) fungicides, (2) insecticides, (3) combinations of fungicides and insecticides, (4) spreaders and stickers, (5) baits, (6) protectives and traps, (7) disinfectants, (8) measures against birds and mammals, (9) weed-killers, (10) preparations for use against deficiency diseases, (11) miscellaneous.

1708. ZILLIG, H. 634.8-2.9
Die wirtschaftliche Bedeutung des Rebstocks in Deutschland. (The economic importance of disease and pest control in viticulture.)
Mitt. biol. Reichsanst. Land- Forstw., 1941, Hft. 62, 35 pp. [received 1948].

The following points are discussed and illustrated, where relevant, with figures and graphs: (1) the value of the vine in German horticulture and the importance of controlling its pests and diseases, (2) the preparations used and the average cost of applying these per annum per hectare for controlling individual pests and diseases, and (3) measures which have led to increased yields, with graphs showing the yields from the various wine growing regions of Germany in the years immediately preceding 1938.

1709. POWELL, D., CHANDLER, S. C., AND KELLEY, V. W. 634.1/7-2.95
Pest control in commercial fruit plantings.
Circ. Ill. Coll. Agric. Ext. Serv. 610, 1947, 36 pp.

An account of control measures recommended for insect pests, mice and rabbits, attacking tree and bush fruits (including grapes and strawberries), with a spray or dust schedule for each kind of fruit. Measures against apple scab, bitter rot and blotch are also included.

1710. WENZL, H. 632.9
Zur Erfassung des Schadensausmasses in Pflanzenschutzversuchen. (The evaluation in plant protection trials of the damage caused by pests and diseases.) [English summary.]
PflSchütz Ber., 1948, 2: 81-4, bibl. 2.

PLANT PROTECTION OF DECIDUOUS FRUITS

The method of Townsend and Heuberger (*Plant Disease Rep.*, 1943, 27: 340-3) is discussed. Its results are confirmed by the author's own trials. The test organism was *Cercospora beticola* on sugar beet.—Inst. for Plant Protection, Vienna.

1711. REINMUTH, E. 632.9: 581.5
Pflanzensoziologie und Pflanzenschutz. (Plant associations and plant protection.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 66-9, 91-3, bibl. 25.

The association of wild plants as an indicator of (1) soil properties and mineral deficiencies, and (2) the hibernation of pests (*Meligethes aeneus*). The presence of secondary or intermediate hosts in plant associations. The hedge as a source of danger. Antagonism in the association of plants. Antagonism in soil microflora and soil sterilization.

1712. AFANASIEV, M. M., AND MORRIS, H. E. 634.23-2.4 + 2.8
Diseases of sweet cherries in western Montana.
Plant Dis. Repr., 1948, 32: 3-4.

Virus diseases found were mottle leaf, rusty mottle, rasp, and the ring-spot and lace-leaf complex. Among bud- and scion-perpetuated diseases crinkle was found on some trees: the symptoms of crinkle show maximum development in June, the set of cherries is always small and the fruit is usually conical, with a deepened suture, and insipid. Silver leaf disease of sweet cherries is important in areas where cherry trees are grown in low, wet areas with poor drainage.

1713. DEMAREE, J. B. 634.75: 632.3/4 + 632.8
Diseases of strawberries.

Fmrs' Bull. U.S. Dep. Agric. 1891, 1948, 28 pp.

An illustrated account of the most important strawberry diseases in the United States. Each disease is described, with recommendations for control. Since leaf spot, leaf scorch, dwarf, red stele root disease, root knot, June yellows, and virus diseases may be distributed in the propagating stock, the most practical general means of controlling them are frequent renewal of fields and the use of disease-free plants for setting new fields.

1714. BUNDESANSTALT FÜR PFLANZENSCHÜTZ. 634.8-2.1/9(436)

Flugblätter. (Leaflets.)

Vienna II, Trunnerstrasse 1-5, 1948.

Further numbers of the series of leaflets on pests and diseases of agricultural and horticultural crops in Austria (see *H.A.*; 18: 930). The latest received, No. 50, of 12 pages, is on keeping grape vines healthy; it lists the vine's pests and diseases with their symptoms, and on p. 10 is a spray calendar.

Nutritional disturbances.

(See also 1590, 1670i, 2306, 2307.)

1715. ROACH, W. A. 632.19
Mineral deficiency in plants: diagnosis and cure.
Brit. Sci. News, 1948, 1: 13-16, illus.

A simple and well-illustrated account for the layman of the plant injection methods developed by the author.

1716. NICHOLAS, D. J. D. 581.192
Chemical tissue tests.
(Mimeo. Publ.) Long Ashton Res. Stat., 1948 (?), pp. 11, bibl. 10.

Rapid field tests to confirm visual diagnosis are described; the deficiency or toxicity of several elements can be established without full analysis. By following seasonal trends it is sometimes possible to anticipate the development of deficiency or toxicity before symptoms appear. "This technique has proved invaluable for rapid diagnostic work and is undoubtedly destined to play an important part in

resolving complex nutrient disorders in farm and garden crops."

1717. MULDER, D. 634.1/7-2.19
De gevolgen van onevenwichtige voeding van vruchtbomen. (The consequences of unbalanced nutrition of fruit trees.)
Meded. Direct. Tuinb., 1948, 11: 187-95.

The symptoms of lime-induced chlorosis and of deficiencies of magnesium, zinc and boron are described. From the results of a trial on Early Victoria apple trees spraying with 5% $MnSO_4$ solution before bud-burst is recommended for manganese deficiency. The symptoms of magnesium deficiency differ according to the variety of apple tree affected. In severe cases 4 sprays of a 2% $MgSO_4$ solution will almost completely prevent the occurrence of the symptoms. Sometimes this deficiency is caused by an excess of potash in the soil, due to heavy applications of potash fertilizers containing little magnesium. The occurrence of zinc deficiency was proved by the improvement in the trees after spraying with 5% $ZnSO_4$ before bud-burst and a 1½% solution containing 0.75% lime in summer.

1718. MEIER-JECKLIN, K. 634.1/2-2.19
Untersuchungen über ein nicht parasitäres Zurück- und Absterben von Obstbäumen im Kanton Graubünden. Ursachen und Mittel zur Abhilfe. (Investigations into a non-parasitic die-back of fruit trees in the canton of Graubünden, Switzerland. Causes and remedies.) [French summary 2 pp.]

Landw. Jb. Schweiz, 1948, 62: 193-272, bibl. 8.

A case of mineral deficiency. Analyses showed that the alkaline soil, with a low humus content, was deficient in P, K, B and N. Mg-deficiency was also suspected. Experimental trees grown both in pots and in the two localities thrived in the same soil and produced healthy fruits when the deficient nutrients were supplied. There are many tables and 17 pages of photographs.

1719. GERRITSEN, C. J. 634.23-2.19
Het barsten van kersen. (The splitting of cherries.)

Meded. Direct. Tuinb., 1948, 11: 348-50.

Hypotheses on the cause of fruit splitting in cherries are briefly reviewed. Its intensity varies from year to year and with the variety. It is suggested that control is to be sought in the breeding and selection of varieties with thick and elastic skins, and perhaps also by applying borax as fertilizer and spraying the fruit with copper or boron salts.

1720. FRITZSCHE, R. 634.1/2-2.19
Krankhafter Austrieb der Obstbäume. (An abnormal bud burst of fruit trees.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 198-201, illus.

Apples, pears and cherries in one area of Switzerland failed to break into leaf in spring, 1948. The symptoms of the trouble ranged from a failure of the buds to burst on the tips of branches to completely bare trees without any leaf growth, the latter being of frequent occurrence. In many cases buds began to grow but soon wilted. Investigations at Wädenswil showed that all the tissues of affected trees, including the cambium, were healthy, which indicated that the drought of the 1947 summer was not responsible. Main and lateral roots were uninjured, but up to the beginning of May no fresh root growth had been made. It is suggested that the abnormal phenomena are due to the incidence of a warm winter, during which the buds began to swell, in combination with severe cold in the middle of February, which retarded the necessary corresponding root growth. The trouble was diagnosed as bud starvation, aggravated by drought or other unfavourable conditions. Irrigation and the application of a complete fertilizer rich in nitrogen is recommended.

PLANT PROTECTION OF DECIDUOUS FRUITS

1721. ERKAMA, J. 631.811.9: 546.56 + 546.711
 Über die Rolle von Kupfer und Mangan im Leben der höheren Pflanzen. (The rôle of copper and manganese in the life of higher plants.) *Ann. Acad. Sci. Fenn.*, 1947, Ser. A, II, 25, pp. 105, bibl. pp. 10.

The following is an abridged translation of the author's summary. (1) The copper and manganese content of 34 plant species has been determined with relation to dry weight, ash content and nitrogen content, and a comparison made with the iron content of the material. The copper content showed a narrow range of variation, while that of manganese was very wide. Plants growing in neutral soil had a low Mn content, which however was not due to Mn deficiency in the soil. There is a certain antagonism between Cu and Mn, some plants with a high Cu-content being low in Mn. A positive correlation exists between water- and Cu-content and a negative correlation between water- and Mn-content. A striking negative correlation exists between the Mn-content of the ash and the ash content of the leaves, the predominance of Mn over Fe being the more marked, the lower the mineral content of the leaf. There is a negative correlation between N- and Mn-content in both leaves and fruit, whereas the Cu-content based on N is fairly constant, though leaves with the highest N-content usually have the highest Cu-content. It is suggested that in the cell Cu is probably completely fixed to protein, while most of the Mn is not fixed organically. The accumulation of Cu and Mn in different plant species and organs is discussed.

(2) The effect of Cu and Mn on peas has been studied in germination experiments and in sterile water cultures. In one-salt solutions Cu promotes root growth but checks the assimilation of seed reserve materials and prevents the uptake of water (concentrations tested up to $1 : 10^4$). A Mn concentration of $1 : 10^7$ injures the root, while shoot formation and longitudinal growth are not affected until a $1 : 10^6$ concentration is reached. In a complete nutrient solution the toxic effect of Cu and Mn is eliminated. Cu deficiency causes sterility and the loss of germinating capacity. Mn deficiency checks vegetative growth, promotes the formation of dry substance and reduces the ash content. Cu increases the uptake of water, salts and iron and checks the uptake of Mn. Mn in the plant checks the uptake of Fe and Cu. An increased uptake of Mn partly drives Fe and Cu out of the leaves. Mn is not easily translocated, it remains in the old, dying leaves. The antagonistic action between the three elements is discussed.

(3) A study has been made of the effect of Cu and Mn on the formation and decomposition of ascorbic acid, on the catalytic and peroxidatic action of plant tissues, and on the pigment content of leaves. In pea water cultures Mn promotes ascorbic acid formation. Ascorbic acid oxidation in pea tissue is reduced by Cu and Mn manuring, which checks peroxidatic oxidations.

(4) In pea leaves both Cu- and Mn-deficiency cause a reduction in chlorophyll a and b content. Mn-deficiency moreover causes a reduction in yellow leaf pigments. Of these only carotene is affected by Cu deficiency.—Biological Institute, Helsinki.

1722. WIEBOSCH, W. A. 634.1/2-2.19: 546.711 + 546.27
 Bespuiting van vruchtbomen met mangaan- en boriumzouten. (The effect of manganese sulphate and borax sprays on fruit trees.) [English summary ½ p.]
Meded. Direct. Tuinb., 1948, 11: 320-3.

Manganese sulphate at 5% sprayed on apple trees on 23rd April prevented the development of manganese deficiency symptoms. Some of the younger leaves of Cox's Orange shoots showed symptoms of iron deficiency, indicating that too much manganese had been absorbed, with an inhibiting effect upon the distribution of iron and its action. Sprays applied in July showed no marked effects. An Allington Pippin tree that had shown marked bitter-pit symptoms previously was divided into 5 sectors, one left untreated, the others sprayed with 0.5, 0.75, 1.0 and 1.5% of borax respectively, on 26th July, 14th August and 4th September. The control developed 50% bitter pit, the others 77, 27, 0 and 4%, from which it is concluded that bitter pit can be checked by spraying with borax.

1723. MULDER, D. 634.11-2.19: 546.27
 Voorlopige mededeling over bestrijding van stip in appels door toediening van borium in de vorm van borax. (The application of borax against bitter-pit of apples.) [English summary ½ p.]
Meded. Direct. Tuinb., 1948, 11: 315-19.

The author discusses the relation between internal cork (corky core) and bitter pit. Internal cork is unknown in Holland. It is suggested that bitter pit is due to late boron deficiency and internal cork to early boron deficiency. Experiments offer confirmation. Injected borax reduced bitter pit from 31 to 4%; potassium phosphate reduced it to 19%. Spraying with 0.25% borax reduced bitter pit from 68% to 20%. Internal cork would be the result of real boron deficiency in the soil, in contrast with bitter pit resulting from calcium accumulation in the apple inhibiting boron transport and activity in the apple on calcareous soils.

1724. VAN KOOT, Y. 634.1/2-2.19
 Bestrijding van chlorose bij perziken- en pruimebomen onder glas door middel van boorgatenbehandeling. (The control of chlorosis in greenhouse peach and plum trees by injection.) *Tuinbouw*, 1948, 3: 7-10.

The relation between chlorosis and deficiencies of available iron and manganese is discussed, and a method of inserting iron or manganese citrate (as flakes, not as powder) in holes bored into the stems or branches is described.

1725. MULDER, D. 634.1/8-2.19: 546.47
 Carences zinciques chez des arbres fruitiers en Europe. (Zinc deficiencies of fruit trees in Europe.)
C.R. Acad. Agric. Fr., 1948, 34: 177-8.

A disease of apple trees in Holland is attributed to zinc deficiency. The chief symptoms as seen on the variety Golden Delicious are, a yellowing of the interveinal portions of the leaves and a wavy leaf margin, short internodes resulting in "rosettes", retarded maturation of the twigs, a rubbery consistency of the branches, abnormal branching resulting in witches brooms, and smallness of fruits. Similar symptoms have been seen on other apple varieties, e.g. Keswick Codlin, Cox's Orange Pippin, Jonathan, etc., and on pear and cherry trees. Recovery was observed after spraying in winter with 5% zinc sulphate, and also with 1.5% zinc sulphate containing 0.75% lime. The same disease is said to have occurred in Switzerland and Denmark.

1726. VEERHOFF, O. 634.25-2.19-1.85
 Phosphorus deficiency of peach trees in the sandhills area of North Carolina.
Proc. Amer. Soc. hort. Sci., 1947, 50: 209-18, bibl. 13, illus., being *J. Ser. 256, Dep. Hort., N.C. Exp. Stat.*

A report which provides what is apparently the first description of acute phosphorus deficiency in a bearing peach orchard".

1727. THOMAS, W., MACK, W. B., AND FAGAN, F. N. 634.11-2.19-1.811
 Foliar diagnosis: internal bark necrosis in young apple trees.
Proc. Amer. Soc. hort. Sci., 1947, 50: 1-9, bibl. 8, illus.

The nutrition of young apple trees which exhibited bark

PLANT PROTECTION OF DECIDUOUS FRUITS

abnormalities resembling those described by Berg as internal bark necrosis was examined by the method of foliar diagnosis. The severity of the disease was not found to be associated with the concentration in the leaves of the minor elements iron, boron, or manganese. [From authors' summary.]

1728. HARLEY, C. P. 634.13-2.19-1.811.6

Magnesium deficiency in Kieffer pear trees.
Proc. Amer. Soc. hort. Sci., 1947, 50: 21-2, bibl. 1, illus.

A short note on a suspected case of magnesium deficiency, with "a description of the unique and distinctive symptom pattern" observed in the leaves.—Beltsville, Md.

1729. NICOLAS, G., AND AGGÉRY, —. 634.21-2.19

La dépréisslement de l'abricotier dans la région de Prades. (The death of apricots in the Prades region.)

C.R. Acad. Agric. Fr., 1948, 34: 252-4.

The authors mention the various opinions on the cause of "apoplexy" in apricots and then describe their own observations on the disease in the Prades region (Pyrénées-Orientales). They found no evidence of insect injury or any fungus fructifications associated with the disease, but there were numerous bacteria in the discoloured tissues. They consider the trouble is not due to drought or soil conditions, or to the rootstock used, but that too drastic pruning may have allowed the bacteria to enter. More detailed observations and research are advised.

1730. HAVIS, L., AND GILKESEN, A. L. 634.25-1.453

Toxicity of peach roots.

Proc. Amer. Soc. hort. Sci., 1947, 50: 203-5, bibl. 8.

Difficulty is frequently experienced in establishing young peach trees on old peach sites. A common explanation is that peach roots set up toxicity in the soil. An account is given of an experiment undertaken to determine the effect of additions of peach root-bark, whole peach roots, and water-soluble peach-root leachate to young peach trees growing in high-nutrient sand-cultures. No evidence of any toxic substance was found—a result which is not in agreement with the findings of earlier workers.—U.S. Plant Industry Stat., Beltsville, Md.

Climatic factors.

(See also 1552, 1632, 1686.)

1731. BRIERLEY, W. G. 634.1/8-2.111

The winter hardiness complex in deciduous woody plants.

Proc. Amer. Soc. hort. Sci., 1947, 50: 10-16, bibl. 17, being *Pap. Misc. J. Ser. 602, Minn. agric. Exp. Stat.*

The author presents the concept that winter hardiness is a complex of several specific factors and states that relatively little consideration has been given to these in the past. Many records show only the survival rate, or the degree of injury sustained by the plant. It is suggested that some of the old standards of hardiness should be re-examined in the light of the behaviour of the large number of new varieties which have been introduced in recent years. No attempt is made to survey all the literature on hardiness, the aim being to call attention to the need for further investigation. The several factors which appear to be properly included in the hardiness complex are briefly discussed under the following heads and sub-heads: basic factors (conditions of plant, variety, maturity, exposure); water relations (winter desiccation); temperature relations (rest period, dormancy, time and rate of development of cold resistance, ultimate cold resistance, retention or loss of cold resistance, ability to regain cold resistance).—Univ. of Minnesota.

1732. PALUDAN, H. 632.111: 634/635
Winter damage to trees, shrubs, perennials and bulbous plants in 1946-47.

Yearb. roy. vet. agric. Coll. Copenhagen, 1948, pp. 64-100.

This compilation of frost damage to plants in Denmark, sustained during the winter 1946/47, is based on 45 replies to questionnaires sent all over the country. Losses were heavy generally, but the island of Bornholm and the southern islands suffered least, the interior of North Jutland most. A list of trees, shrubs, perennials and bulbs, extending over 31 pages, indicates the degree of damage sustained by individual species, the injury caused by the winter 1941/42 being shown in comparison. Though all fully hardy species are not named, the list includes a large number of plants that were not harmed by either of the two winters.

1733. WOUDENBERG, J. P. M. 632.111

De nachtvorst en haar bestrijding, benevens een verslag van de temperatuurmetingen in 1946. (Ground frost and its prevention, and temperature records in 1946.) [English summary 12 1.]

Meded. Direct. Tuinb., 1948, 11: 238-51, bibl. 13.

After a review of the meteorological conditions conducive to ground frosts, advice is given on planting susceptible crops, and frost protection methods are noted. Temperatures were recorded at 1.5 m. and 10 cm. above ground level at six places in Holland to ascertain which were most suitable for an extension of horticulture.

1734. ANON. 632.111: 656.7

Frost fighting with a helicopter.

Fmr and Stk-Breed., 1948, 62: 1245.

Experiments at the West of Scotland Agricultural College under conditions of a radiation frost, i.e. the coldest air being at ground level, showed that when a helicopter hovered for 15 minutes there was a marked rise in temperature up to 10 ft. above the ground. The mere passage of the machine was less effective.

1735. PICHLER, F. 632.111

Über den Kohlensäure- und Sauerstoffgehalt der Luft unter einer Schneedecke. (The carbon dioxide and oxygen content of air under a snow cover.) [English summary 9 11.]

PflSchutz Ber., 1948, 2: 74-80, bibl. 5.

In the course of several winters, on a winter rye plot, the air under a snow cover 14-53 in. deep, persisting 17-92 days, did not show oxygen deficiency. CO₂ concentration increased only slightly, the highest value encountered being 0.21 vol. %.—Inst. for Plant Protection, Vienna.

1736. VAN DER MUYZENBERG, E. W. B. 632.111: 634.1/7

De wering van nachtvorstten. (Protection against night frosts.)

Fruiteelt, 1948, 38: 244-5, 260-2, illus.

An outline of the meteorological conditions leading to night frosts with notes on how to obviate frost damage to fruit trees by mixing the air layers, influencing the airflow, employing heat and the use of chemicals.

1737. MEURMAN, O. 634.1/2-2.111

Iakttagelser av skador på fruktträd försorsakade av tjälén under våren 1947. (Observations on frost damage to fruit trees [in Finland] sustained in the winter of 1946/47.)

Sver. pomol. Fören. Årsskr., 1947, 48: 63-70.

Although the 1946-47 winter in Finland was not more severe than normal, an unexpectedly large number of fruit trees were either damaged or killed by frost. In all cases the root was the part injured, with the result that the trees dried up completely in June, after flowering, or showed severe symptoms of wilting. At the Kokemaki research station the soil was frozen to a depth of 150 cm. in March, and in the middle of June a zone at the depth of 40-50 cm. was

PLANT PROTECTION OF DECIDUOUS FRUITS

still frost-bound. Thus the younger, more shallow-rooted trees almost escaped damage, while older trees succumbed. In the pomological collection of the Piikkiö station 11% of the 11-15-year-old trees died of water deficiency after flowering, as against 3-5% of the 4-5-year-old ones. At the same place, in the cherry plot, all the large trees were killed, whereas the young trees, interplanted the previous summer, made an annual growth of 70-90 cm. Clonal apple rootstocks showed great differences in susceptibility, the following percentages being killed: M. I., 4·8; IX, 55·6; II, 5·3; IV, 36·7; VII, 18. The top of the tree, even in the most frost-susceptible scion varieties, was not affected.

1738. KOBEL, F. 632.111
 Ein Grossversuch zur Frostbekämpfung durch Räuchern. (A large-scale experiment in frost control by smoke.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 177-81, illus.

An apparently successful but not very exactly controlled attempt to prevent frost damage to cherry blossom by smoke in the canton of Basle.

1739. GALLAY, R., AND DARBLE, P. 632.111
 La lutte contre le gel au moyen de chauffelettes. (The use of heaters against frost.)
Rev. romande Agric. Vitic., 1948, 4: 19-21, 27-8.

The heaters described are of the standard Californian pattern, a modification for low growing crops, and the large Michigan infra-red heater [type B]. When the atmospheric humidity is high enough, it is possible to make artificial fog by putting ammonium chloride on modified Californian heaters. The Parrenin smoke generating apparatus has also been tried, but as yet the weather has not allowed the comparison of these measures under appropriate conditions.—Lausanne.

1740. HASSLER, F. J., HANSEN, C. M., AND FARRALL, A. W. 632.111
 Protection of vegetation from frost damage by use of radiant energy—Part III.*
Quart. Bull. Mich. agric. Exp. Stat., 1948, 30: 339-60.

An inexpensive new radiator, type AA, is described: it is similar to type A in intensity and distribution of radiant energy, but it operates at 1,500° C. (instead of 1,000° C.), has half the radiating surface, and consumes 10 (instead of 14) gallons of oil per hour. Tests made in the autumn of 1947 showed that these units can give considerable protection, and can run for several hours unattended. Their effectiveness depends on weather conditions, the crop to be protected, associated vegetation, and the lie of the land.

1741. PEYER, E. 634.8-2.13
 Deckversuche bei Reben gegen Hagelschäden. (The covering of vines for hail protection.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 193-8.

Trials, carried out over a 5-year period, have shown that a (10 mm.-mesh) net covering affords protection against hail to vines and tomatoes. A further advantage is that the covering simplifies disease control. Both these crops grown under a net impregnated with a 6% bordeaux mixture and sprayed once after flowering were healthier and yielded more than the controls which were sprayed 5-7 times. It is concluded that in hail regions the net covering of small areas is profitable with crops which require frequent spraying.—Wädenswil Research Station.

1742. ROMMEL, C. 632.13
 Kritische Bemerkungen zum Hagelschiessen. (Critical remarks on the prevention of hail by explosives.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 87-91, bibl. 4.

* For Parts I and II, see *ibid.*, 1946, 29: 53-63, *H.A.*, 17: 108; and 1947, 30: 21-8, *H.A.*, 18: 204.

This is primarily a discussion of the experiments carried out by Colonel Ruby in the Beaujolais vine area, France, just before the recent war. The verdict is that a hail protection service will be profitable in regions which are exposed to frequent hailstorms and where valuable, susceptible crops are grown, such as vines and fruit.

1743. OSTERWALDER, A. 634.8-2.14
 Ein Blitzschlag in einen Weinberg. (Lightning in a vineyard.)
Schweiz. Z. Obst- u. Weinb., 1947, 56: 471-3.

Since the effects of lightning may easily be confused with disease symptoms, the appearance of a Swiss vineyard is described 2-3 weeks after it was hit by lightning towards the end of August, 1947. The 142 vines affected within a circular area of about 130 m² were conspicuous from a distance by the brown colour of their leaves, some of which showed spots reminiscent of "rougeot". Petioles in particular were damaged, while buds and almost mature red grapes did not suffer any injury, though immature, green grapes were affected. Similarly in the shoots it was again the immature, axillary growth that showed typical symptoms, namely flatness instead of the normal circular cross section. No traces of injury were discovered in stem or stakes.

1744. SUTHERLAND, M. 632.183
 Growing tree stocks for shelter planting.
N.Z. J. Agric., 1948, 76: 133-9, 251-4, illus.

This guide to farmers who wish to raise their own trees for shelter planting discusses sites, kinds of tree, seed extraction, sowing, the formation of a good fibrous root system, lining out, size and age of planting, suitable types for farm planting, and planting stock from cuttings.

1745. JAKUBOV, T. F. 631.459
 Wind erosion of soil and control measures. [Russian.]
Nauka i Žiznj (Science and life), 1947, No. 5, pp. 21-6.

An account is given of the factors involved in soil erosion by wind—the composition of the soil (e.g. humus content), its moisture and vegetation. Measures for reducing susceptibility to wind erosion are discussed in relation to these factors.

1746. SPAFFORD, W. J. 632.183
 Breakwinds and shelters for farms with calcareous soils.
J. Dep. Agric. S. Aust., 1948, 51: 439-46.

Advice on the establishment and care of shelter trees. Raising seedlings in jam tins is described, and a list is given, with notes, of the trees which can be successfully grown in Yorke Peninsula and adjacent areas.

1747. ASHTON, T. 631.523: 632.112
 Technique of breeding for drought resistance in crops.
Tech. Commun. Commonwealth Bur. Plant Breeding and Genetics 14, 1948, pp. 34, bibl. 128, 2s. 6d.

The greater part of this paper is devoted to work with cereals and grasses, but work on the following crops is also mentioned: fruit and nut trees, vines, potato, tobacco, cucurbits, tomato, peas and beans, coffee and sugarcane. Many of the papers reviewed are in Russian, and the value of the bibliography is enhanced by references to *Plant Breeding Abstracts*.

Viruses.

1748. SMITH, K. M. 632.8
 Plant virus research at Cambridge.
Nature, 1948, 161: 776-7.

The inauguration of the new field laboratory of the Plant Virus Research Unit provides an occasion for surveying

PLANT PROTECTION OF DECIDUOUS FRUITS

the work done at the Plant Virus Research Station, Cambridge, which celebrates its 21st birthday in 1948.

1749. JEFFERS, W. F., AND WOODS, M. W.

634.711.2-2.8

Field studies on spread of the mild streak disease of black raspberries.

Phytopathology, 1948, 38: 222-6, bibl. 10.

Mild streak, apparently a virus disease, of black raspberries is widespread in Maryland. It may spread rapidly under field conditions. Current season infection is not readily recognized.—University of Maryland.

1750. MICHEL, A.

634.8-2.8

Étude préliminaire sur un nouvel aspect du problème du court-noué de la vigne. (Preliminary study on a new aspect of the problem of court-noué.)

Ann. agron. Paris, 1948, 18: 179-93, bibl. 10.

The movement of copper in various soils was shown to depend on their mechanical analysis. It is suggested that on certain soils many cases of court-noué of the type recently designated "infectious degeneration" may be due to the effect on the root system of excess copper, resulting from prolonged use of copper fungicides in the vineyard. The hypothesis is being investigated by pot cultures.—Station Oenologique de Bourgogne, Beaune.

1751. MICHEL, A.

634.8-2.8-2.19

Sur un nouvel aspect du problème du court-noué de la vigne. (A new aspect of court-noué of vines.)

C.R. Acad. Agric. Fr., 1948, 34: 179-81.

The author suggests, as a result of certain observations recorded, that court-noué is associated with the rate of permeation into the soil of copper salts derived from copper fungicides used against mildew, and that it is a result of copper poisoning.

1752. BRANAS, J.

634.8-2.8

La dégénérescence infectieuse de la vigne est une maladie à virus. (Vine infectious degeneration is a virus disease.)

C.R. Acad. Agric. Fr., 1948, 34: 301-2, and *Prog. agric. vitic.*, 1948, 129: 337-9.

Cuttings, taken from two stools of Rupestris du Lot, one markedly degenerate (D), the other healthy (S), were grafted in four combinations, S/S, D/D, D/S and S/D. Only the S/S plants remained healthy, all the others showing degeneration. From these results the author concludes that this degeneration is an infectious disease caused by viruses.

Bacteria.

1753. DAY, L. H.

634.2-1.541.11-2.3

The influence of rootstocks on the occurrence and severity of bacterial canker, *Pseudomonas cerasi*, of stone fruits.

Proc. Amer. Soc. hort. Sci., 1947, 50: 100-2, bibl. 5.

Notes on observations and experiments extending over 40 years.—Univ. of California.

1754. SCHENK, P. J.

632.314

Wortelknobbel. (Crown gall.)

Cultuur Hand., 1948, 14: 41-2.

A short illustrated account of crown gall (*Pseudomonas tumefaciens*) with notes on control. Heavy dressings of lime are said to have good given results.

1755. FOLSOM, D.

634.711-2.3

Bacterial twig and blossom blight of raspberry in Maine.

Plant Dis. Rept., 1947, 31: 324.

When infection gets into the stem the upper part may be killed and become black and curved.

Fungi.

(See also 2322, 2334.)

1756. HOROWITZ, N. H., AND SRB, A. M.

632.4: 632.952

Growth inhibition of *Neurospora* by canavanine, and its reversal.

J. biol. Chem., 1948, 174: 371-8, bibl. 17.

L-Canavanine, an amino-acid from jack beans [*Canavalia ensiformis*], is a powerful inhibitor of the growth of certain wild type strains of the mould *Neurospora*. The phenomena are discussed, as is the antagonism between canavanine and arginine. [From authors' summary.]—California Institute of Technology, Pasadena.

1757. HAMILTON, J. M.

634.11-2.42

Evaluation of organic fungicides for the control of *Venturia inaequalis* (Cke) Wint.

Abstr. in *Phytopathology*, 1948, 38: 313-14.

Most organic fungicides have given irregular performances in field tests, and more reliable results were obtained on potted greenhouse-grown trees. Some of the preparations were found to be comparable to liquid lime-sulphur in the length of time that they controlled scab after infection began, while others were only moderately effective. The work supported the trend in field data in that the organics with the greatest retention were superior in seasons when sprays could be timed, but eradicative preparations were most effective in periods of almost continuous rain.

1758. MILLS, W. D., AND VANGELUWE, J. D.

634.11-2.42

Apple scab control with elemental sulfurs in the Hudson Valley in 1947.

Abstr. in *Phytopathology*, 1948, 38: 314-15.

Two pastes and one air-ground sulphur were significantly better (99 : 1) in fruit scab control than micronized sulphur when 5 lb. actual sulphur were used on McIntosh and Delicious. The control of fruit scab on Delicious by 1 and 1½ lb. Fermate equalled that obtained with the 5 lb. dosage of the better elemental sulphurs, and was significantly better (99 : 1) than micronized sulphur.

1759. VAN DE POL, P. H.

634.11-2.42

De schurftwaarschuwingsdienst. (The scab-warning service.)

Fruiteelt, 1948, 38: 228-9, illus.

An account of the Dutch organization for advising fruit-growers when to start spraying against apple scab, involving observations on the discharge of ascospores in relation to the weather.

1760. LOUW, A. J.

634.11-2.42

***Fusciplodium* of apples. II. The origin of the initial infections each year. III. A few factors affecting the incidence of the disease. IV. Can this disease be stamped out? V. Control by spraying.**

Fmg S. Afr., 1947-48, 22: 749-52, 833-36; 23: 28-32, 122-9, illus.

Part I of this series was unnumbered. Part II only had the words ". . . or scab disease . . ." added to the title. In part V the various sprays for controlling scab are summarized as follows: (1) At green tip stage of bud: lime-sulphur (1½ gal. mixture* to 100 gal. water) or bordeaux (10 lb. mixture per 100 gal. water or 5 lb. copper sulphate and 5 lb. lime to 100 gal. water). (2) At closed cluster to pink bud stage: lime-sulphur or bordeaux as above, or copper-oxychloride (5 lb. per 100 gal.) where oil sprays are to be used against codling moth. (3) At full bloom to fall of petals (calyx stage): lime-sulphur or bordeaux or copper-oxychloride as above, or a neutral wettable sulphur (5 lb. per 100 gal.) when fixed nicotine is to be used for codling moth. (4) At approximately 3 weeks after calyx stage: same as (3).

* 32% poly-sulphide sulphur, calculated.

PLANT PROTECTION OF DECIDUOUS FRUITS

1761. ANDRÉN, F. 634.11-2.42
Besprutningsförsök mot äppleskrov. (Spraying trials against apple scab.)
Växtskyddsnotiser, 1947, No. 5, pp. 69-73.
The results of spraying trials against apple scab, carried out in two localities between 1943 and 1947, are summarized in two tables. With the variety Signe Tillisch bordeaux mixture was distinctly better than the other chemicals tested, while differences were less pronounced with the summer apple Sävstaholm. Nosparit, which could be tested only once on Signe Tillisch in 1943, was equal to bordeaux but was in short supply. A third table records the average weights of healthy and scabby fruits. Bordeaux-treated Sävstaholm apples, for instance, weighed 77 g. when scab-free, 71 g. with scabby spots, and 54 g. when scabby.—Inst. for Plant Protection, Stockholm.

1762. DARPOUX, H., AND VUITTENEZ, A. 634.13-2.42
Essais de traitements complémentaires contre la tavelure du poirier. (Complementary treatments against pear scab.)
C.R. Acad. Agric. Fr., 1948, 34: 247-9.
It is concluded that by complementary treatments, viz. (1) sprays to prevent dispersal of ascospores from the fallen leaves, (2) sprays to stimulate the dissemination of the spores at a time when these are not dangerous, and (3) pre-budburst sprays, it is possible to reduce considerably the intensity of the primary attacks of pear scab.

1763. WORMALD, H. 632.4: 631.876
Waste-wood mulches are safer when weathered.
Grower, 1948, 29: 848-9.
The bootlace fungus, *Armillaria mellea*, is unlikely to attack fruit tree prunings or sawdust while these remain on the surface of the ground. After exposure for several weeks such material can safely be buried. Mr. F. C. King adds a note to the effect that *Armillaria* has never attacked a thriving plant in his gardens, where large dressings of sawdust are applied.

1764. TAYLOR, C. F., AND PEET, C. E. 634.23-2.4
Bitter rot on sour cherry.
Plant Dis. Rept., 1947, 31: 392-3.
Severe infection by *Glomerella cingulata* on sour cherries is reported from Jefferson County, West Virginia, in 1947. Orchards in which there was high incidence of disease were close-planted on low ground with poor air drainage. Very little disease occurred on smaller trees on higher ground.

1765. HILDEBRAND, E. M. 634.25: 632.4
Perennial peach canker and the canker complex in New York, with methods of control.
Mem. Cornell agric. Exp. Stat. 276, 1947, 61 pp., bibl. 75.
In the peach canker complex in New York State major roles are played by two cool-season pathogens (*Valsa cincta* and *V. leucostoma*) which cause severe perennial cankers, and minor roles by *Monilinia fructicola* and *Fusicoccum amygdali* which cause short-lived cankers during the growing season. Canker prevention involves the prevention of injuries which serve as infection courts for the Valsas. Field experiments showed bichloride of mercury, cyanide of mercury and Elgetol to be safe wound disinfectants, while water asphalt emulsion was the best wound dressing used. Cutting out perennial cankers was highly successful when applied to young cankers.

1766. BLUMER, S., AND GONDEK, J. 632.482
Über die Wirkung des Oxychinolins auf *Botrytis cinerea* Pers. (The action of oxyquinoline on *Botrytis cinerea*.) [English summary ½ p.]
Reprint *Schweiz. bot. Ges.*, 1946, 56: 467-99.
A strain of *Botrytis cinerea* isolated from grapes showed different reactions to hydroxyquinoline according to its stage of development, the toxic action being most pronounced on the young growing mycelium. The value of hydroxyquinoline for soil disinfection against *Botrytis* is slight; formaldehyde is better.

1767. LUTTRELL, E. S. 634.848-2.4
Botryosphaeria ribis, perfect stage of the *Macrophoma* causing ripe rot of muscadine grapes.
Phytopathology, 1948, 38: 261-3.
Only the *Macrophoma* pycnidial stage of the fungus has been found on diseased berries. The perfect stage was obtained by inoculating sterile grape stems and overwintering them out of doors.—Georgia Experiment Station.

1768. URI, J. 632.42: 634/635
Het parasitisme van *Nectria cinnabarina* (Tode) Fr. (The parasitism of *Nectria cinnabarina*.) [English summary 1½ pp.]
Doctor's Thesis, Utrecht, 1948, 88 pp., bibl. 80.
Cultures of the coral spot fungus, *Nectria cinnabarina*, were isolated from various hosts and inoculated into a number of different plants (including currant and peach) with positive results, which were critically examined and described.

1769. MOOI, J. C. 634.973.623: 632.4
Kanker en takinsterving van de wilg veroorzaakt door *Nectria galligena* en *Cryptodiaporthe salicina*. (Canker and die-back of willow caused by *Nectria galligena* and *Cryptodiaporthe salicina*.)
Doctor's Thesis, Baarn, 1948, 119 pp., bibl. 75.
Willow canker is attributed to *Nectria galligena*, the apple canker fungus. Inoculations with the willow fungus gave positive results on apple.

Mites and insects.

1770. MILES, H. W., AND MILES, M. 632.6/7(42)
Pests in season [in Britain].
Grower, 1948, 29: 464-5, illus.
The first of a series of short articles on individual horticultural pests, showing how to find, identify and control them.

1771. SOENEN, A. 41.3: 632.3/8
Lijst der voornaamste vijanden in land en tuinbouw. (List of the most important pests and parasites in agriculture and horticulture.) [In 5 languages.]
Publ. Opzoekingsstat. Gorsem No. 5, 1947, 27 pp.
The scientific name is followed in each case by the popular name in Dutch, French, English and German. The chief host plants are first listed, then the causal organisms, in alphabetical order of scientific name, under bacteria, fungi, ectworms, mollusca, rodents, spiders, various (thrips, etc.), bugs, beetles, hymenoptera, moths and flies.

1772. BROWN, J. G. 632.651.3
Root knot in Arizona.
Bull. Ariz. agric. Exp. Stat. 212, 1948, pp. 40, illus.
Root knot caused by the common nematode (*Heterodera marionii* (Cornu) Goodey), is spreading rapidly in Arizona. It affects about 1,300 different kinds of plant ranging from tomato, cabbage and many other seedlings to fruit trees, shade trees and ornamentals. The parasite, the damage caused and its control by soil disinfection (heat and chemicals) are described. Chemicals used in disinfection are: chloropicrin, carbon disulphide, DD mixture, ethylene dichloride, methyl bromide and formaldehyde.

1773. EATON, J. K., AND DAVIES, R. G. 632.654.2: 634.1/2
Toxicity of azo-compounds and other substances to the fruit tree red spider mite.
Nature, 1948, 161: 644-5, bibl. 5.
A number of compounds were tested in the laboratory against the summer eggs and adult females of the fruit tree red spider, *Metatetranychus ulmi*. A fuller report is promised.—East Malling Research Station.

PLANT PROTECTION OF DECIDUOUS FRUITS

1774. OSSIANILSSON, F. 632.752
 Åro gröna hagtornsbladloppan (*Psylla peregrina* Först.) och rönnbladloppan (*Psylla sorbi* [L] Edw.) endast raser av äppelbladloppan (*Psylla mali* Schmidb.)? (Are the green hawthorn psyllid (*Psylla peregrina* Först.) and the service berry psyllid (*P. sorbi* [L] Edw.) only biological races of the apple sucker (*P. mali* Schmidb.)?) [English summary 1 p.]
Meddel. Växtskyddsanst. Stockh. 51, 1948, pp. 14, bibl. 11, illus.
 The author considers these psyllids to be three distinct species, normally confined to their individual host plants.

1775. THIEM, H. 634.72-2.752
 Die San-José-Schildlaus an der Bergstrasse. (The San José scale in the Bergstrasse [Germany] area.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 25-6.
 Currant plantations in the Heidelberg area are suffering severely from an attack of San José scale. Regulations to prevent the spread of the pest have come into force.

1776. SCHNEIDER, F. (BERAN, F.). 632.752
 Die Bekämpfung der San-José-Schildlaus in Oesterreich und einige Schlussfolgerungen für die Schweiz. (The control of the San José scale in Austria and some conclusions for Switzerland.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 46-9.
 In a paper read at Bern in January, 1948, Dr. Beran, director of the institute for plant protection, Vienna, describes the control measures carried out against the San José scale in Austrian nurseries. In addition to winter spraying, HCN fumigation is compulsory. Under normal conditions 10 g. HCN are sufficient for 1 hour's fumigation of 1 m³ at not less than 5°C. The success of this treatment is complete, and no plant injury has ever been observed.

1777. P[EYER], E. 634.8-2.752
 Die San-José-Schildlaus auf den Reben nicht pflanzungsfähig. (The San José scale incapable of reproduction on vines.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 188.
 Professor Malenotti is quoted as stating in *Landwirt* (Bozen, South Tyrol) that the San José scale is incapable of breeding on vines. This is confirmed by observations in the Ticino.

1778. SCHILDER, F. A. 634.8-2.752
 Die Aussichten der Reblausbekämpfung durch Rebenzüchtung. (The prospects of phylloxera control in vines by breeding.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 104-5.
 For many years the Naumburg branch of the Biologische Zentralanstalt has been breeding vines with the object of producing a rootstock immune both in leaf and root to all biotypes of *Phylloxera vastatrix* and *P. vitifoliae*. Many tens of thousands of seedlings have already been investigated. Crosses of *Vitis cinerea* with European × American vine hybrids and with American vines yield a percentage of 0·2 and even of 0·5 leaf-immune seedlings. As the number of leaf-immune vines rises, the probability increases of finding a completely immune seedling.

1779. MENZEL, R. 632.753: 632.96
 Ein willkommener Blattlausvertilger. (A welcome aphid predator.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 236.
 The larvae of *Chrysopa* (Neuroptera) were found to devour large numbers of aphids in fruit trees and to attack woolly aphid as well.

1780. LEISHMAN, E. 634.23-2.753
 Black cherry aphid and D.D.T.
J. Dep. Agric. S. Aust., 1948, 51: 395.
 In samples taken immediately after spraying the DDT content exceeded tolerance levels (8 parts per 100,000).

Samples of Florence cherries taken when fully ripe after spraying, when the fruit was just beginning to colour, showed DDT content well below tolerance. DDT is satisfactory for controlling black cherry aphid but its value is offset by the build-up of bryobia mite. This will probably bar the use of DDT on cherries unless mite control measures are also taken.

1781. BORG, A. 632.753
 Om blodlusens övervintring 1946-1947. (The overwintering of woolly aphid in 1946/47.)
Växtskyddsnotiser, 1947, No. 6, pp. 81-5.
 Colonies of woolly aphid were examined at regular intervals from February, 1947, onwards and the survival figures were determined for the aphid and its parasite *Aphelinus mali*. It was found that the severe winter (minimum temperature -18.5°C.) was much more injurious to the pest than to the parasite. In March only 1-2% of the aphids were alive and in April and May none, while the survival figure of *A. mali* remained at 25-35%. Later, the aphid population recovered rapidly. Observations showed that apple trees attacked by woolly aphid in the previous season suffered from frost much more severely than trees that were not parasitized.—Inst. for Plant Protection, Stockholm.

1782. BESSON, J., AND SCALA, A. 634.1/2-2.76
 Observations sur *Cantharis obscura* L., nuisible aux arbres fruitiers dans la région de Vic-Bigorre et essais de lutte contre cet insecte. (*Cantharis obscura* damaging fruit trees in the Vic-Bigorre region and control trials.)
C.R. Acad. Agric. Fr., 1948, 34: 306-12, bibl. 4.
 The *Cantharis obscura* beetle was found, in 1947, to attack pear, apple, quince and cherry trees in the Vic-Bigorre region of the Pyrenees. The damage was chiefly to the flowers, the reproductive organs (stamens and pistils) being damaged or eaten off. The females, which are most destructive, appear to prefer the pear to other hosts. Good control was obtained by sprays or dusts containing rotenone or DDT.

1783. HALLEMANS, A. 632.76: 634.1/2
 De schorskevers "Scolytidae". (Bark beetles.)
Cultuur Hand., 1948, 14: 44-6.
 A popular illustrated account of the habits of, and the damage caused by, bark beetles, *Scolytus rugulosus* and *S. mali*, and wood-boring beetles, *Anisandrus dispar* and *Xyleborus saxeseni*, on fruit trees, with notes on control measures, which include painting the stems and thick branches with 5% fruit-tree carbolineum or spraying with preparations of DDT, H.C.H. or 1-2% lead arsenate.

1784. HOUTMAN, G. 634.1/2-2.76
 Enige insecten, die aandacht vereisen. De entkever (*Phyllobius oblongus* L.). (Insects requiring attention—the graft beetle.)
Fruiteelt, 1948, 38: 263, illus.
 This leaf weevil is described as causing severe damage to grafted fruit trees in West Friesland. Good control is reported by spraying with double-strength DDT.

1785. PETERSEN, H. I., AND STAPEL, C. 632.95: 632.76
 Afprøvning af kemiske Bekæmpelsesmidler mod Plantesygdomme og Skadedyr. II. Diklor-diphenyl-trikloräthan (DDT) m.fl. (The chemical control of plant diseases and pests. II. DDT.) [English summary ½ p.]
Tidsskr. Planteavl., 1947 (?), 51: 136-46, being *Beretn. St. Forsøgvirks. Plantekult.* 402.
 Earlier tests had shown that DDT is effective against a number of pests. In the present trials the dosage required for effective control was determined, expressed as kg. of a 5% dust per hectare: Flea beetle, 10; blossom beetle (*Meligethes aeneus*), 10-15; raspberry beetle and strawberry weevil, 15-30. In laboratory tests the effect of DDT was

PLANT PROTECTION OF DECIDUOUS FRUITS

found to be independent of temperature, while the control value of derris decreased with a high temperature.—Danish Plant Pathological Institute, Copenhagen.

1786. LEEFMANS, S. 634.13-2.77
De peregralmug, levenswijze en bestrijding. (The pear midge, its habits and control.)
Fruitteelt, 1948, 38: 212-14, illus.

The life history and habits of the pear midge, *Contarinia pyrivora* Riley, are described in relation to phenological observations. For controlling the midge the advantage of DDT over nicotine preparations is that its action is more persistent, so that the exact timing of applications is not essential. As soon as the first midges appear the inflorescences, branches and ground should be sprayed, and the applications should be repeated weekly during the insect's flight period.

1787. HIBON, J. 634.1/2-2.77
Luttez avec succès contre la mouche des fruits ! (Control the Mediterranean fruit fly !)
Fruits Prim., 1948, 18: 116-18.

The writer outlines a plan of campaign for controlling the Mediterranean fruit fly: whenever traps indicate an increase in the fly population 666 should be applied with a wettener, or with white oil, if scale is prevalent. Early trials in Morocco have been promising. The odour of 666 may prevent its use for certain fruits in the last three weeks before harvest.

1788. ALLEN, W. R., AND BIRD, R. D. 634.72: 632.772
Control of the currant fruit fly on the Canadian prairies.
Proc. Publ. Canad. Dep. Agric. 46, 1948, pp. 3.

Notes on the life-history and control of *Epochra canadensis* Loew. Control measures recommended are spraying the foliage with the following mixture: cryolite 4 lb., molasses 13 qts., water 80 gal., or for small quantities, 6½ teaspoonsfuls, 10 tablespoonsfuls, 1 gal. respectively. Recent tests have shown that excellent control can be obtained by using 1 lb. of 50% wettable DDT to 100 gal. water, spraying the bushes until they begin to drip.

1789. BÖHM, H. 634.22-2.77
Untersuchungen über Biologie und Bekämpfung des Pflaumenwicklers (*Grapholita funebrana* Fr.). (Biology and control of the red plum maggot, *Grapholita funebrana* Fr.)
PflSchutz Ber., 1948, 2: 1-15, bibl. 7.

While up to recently the red plum maggot was of little importance in Austria, the percentage of fruits attacked in 1946 and 1947 was determined as 10-12 for the first generation and as approaching 85 for the second. A biological study of the pest led to the recommendation of the following control measures: First generation: Apply the first spray on the 10th day after the appearance of the first moths, i.e. about 4-4½ weeks after blossoming, and repeat the treatment after 12 days. Second generation: First application one week after the appearance of the first moths, second treatment 16 days later. Of the compounds tested only Gesarol (1%) + Sandovit spreader gave satisfactory control, the so-called "effect" being 81%. Mechanical measures, such as trapping of the larvae and the collection of windfalls are advocated in support of the chemical control.—State Institute for Plant Protection, Vienna.

1790. CALMEGANE, F., AND MAILLOU, A. 634.13-2.77 + 2.78
Deux parasites accidentels des poires. (Two chance infestations of pears.)
Arbres et Fruits, 1948, No. 27, pp. 3-7, illus.

The unusually hot summer of 1947 allowed the Mediterranean fruit fly, *Ceratitis capitata*, and the oriental peach moth, *Laspeyresia molesta*, to infest pears in the neighbourhood of Paris.

1791. BOVEY, P., AND SAVARY, A. 632.78: 634.1/2
Les dinitrocresols dans la lutte contre les hyponomeutes. (Dinitrocresols to control the small ermine moth.)
Rev. romande Agric. Vitic., 1948, 4: 38-40.
Young overwintering caterpillars of the small ermine moth, *Hyponomeuta malinella*, on apples or *H. padella* on plums, are killed by neutral or acid DNC sprays.—Lausanne.

1792. STEINER, L. F., MCALISTER, H. J., AND SUMMERS, S. A. 632.78
Control of the red-banded leafroller in the middle west.
Proc. 93rd Ann. Meet. N. York St. hort. Soc., 1948, pp. 57-64.
Under mid-western conditions the orchard-wide use of DDT has resulted in serious outbreaks of the red-banded leafroller moth (*Argyrotaenia velutinana* (Wlk.)). Lead arsenate at only 2 lb. plus a 50% DDT wettable powder at $\frac{1}{2}$ lb. or more per 100 gal. in four first-breed sprays following its use alone in a calyx and first-cover spray effectively checked heavy infestations in 1946 and 1947.—From authors' summary.

1793. (DIRECTIE VAN DE LANDBOUW.) 632.78
Rupsenplagen in loofhout. (The caterpillars of broad-leaved trees.)
Meded. PlZiekt. Dienst, Wageningen, 59, 29 pp., illus.
Descriptions are given with illustrations of *Euproctis phaeorrhoea* (brown tail moth), *Lymantria dispar* (gipsy moth), *Malacosoma neustria* (lackey moth), *Stilpnobia salicis* (white satin moth), *Hyponomeuta malinella* and *H. padella* (ermine moths). Of these the white satin moth is practically confined to poplar and willow but the others may invade orchards and gardens and attack leaves of fruit trees. A table shows briefly how they may be distinguished and methods of control.

1794. TUNBLAD, B. 632.78: 634.1
Giftkli mot jordflylarver i plantskola. (Cut-worm control in the nursery by poisoned bran.)
Växtskyddsnositer, 1947, No. 4, pp. 53-5.
Towards the end of August, 1947, when budding was due to be carried out, great damage was noticed in the apple and pear plots of a large Swedish nursery. Many of the rootstocks were ring-barked above the root collar (width of ring 2-4 cm.) and others showed evidence of a less severe character. On closer investigation numerous cut-worms, the larvae of the turnip moth *Agrotis segetum*, were found in the soil around each of the injured trees. A bait consisting of 50 kg. wheat bran mixed dry with 3 kg. Cryocide (100%) and moistened with about 40 litres of water, in which 3-4 kg. sugar had been dissolved, was applied in the evening to 11,000 m. of tree row. A kill of about 90% was thereby achieved.

1795. KADOCZA, G. 634.38-2.78
Der amerikanische weisse Bärenspinner in Ungarn. (The American fall webworm in Hungary.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 154-7, 165-7.
It is supposed that the fall webworm, *Hyphantria cunea*, was introduced into Hungary from the United States during the second world war. In 1946 it was first observed as a pest and in 1947 its incidence assumed dangerous proportions. So far, mulberry and box elder (*Acer negundo*) appear to be the primary hosts, and among fruit trees plum and cherry. The extremely rapid spread of the pest—it has covered two-thirds of the country within two years—is due to the absence of natural enemies which keep it in check in America. Control is difficult since (1) DDT and Gammahexane are ineffective, (2) nicotine will penetrate the thick web of the nest only if applied at high pressure, and (3) the

PLANT PROTECTION OF DECIDUOUS FRUITS

larva is very resistant against arsenicals. However, a 0·7-0·8% calcium arsenate spray or nicotine should be tried for the protection of fruit trees, and certain sanitary measures are recommended. The biology of the pest in Hungary, where it develops two generations, is described.

1796. SURANYI, P. 634.1/2-2.78
Ein neuer Schädling in Europa (*Hyphantria cunea* [Drury]). (An insect pest new to Europe (*Hyphantria cunea* Drury)).
PflSchutz Ber., 1948, 2: 33-42.

An illustrated description is given of the life cycle in Hungary of the fall webworm, which was first observed in Europe near Budapest in 1940. Since then the rapid spread of this insect, which is especially harmful as a pest of mulberry and fruit trees, has caused great alarm. A list of host plants is given on which it has been found feeding in Hungary. The following recommendations are made for control: Remove and destroy all nests of larvae. The cocoon of these nests provides protection against sprays, so that there is no point in using nicotine, unless it is applied by a high pressure motor sprayer. On varieties which can tolerate it, calcium arsenate sprays should be used at a concentration of 0·75-1%, while a concentration of 2-3% is required for DDT sprays. Since the larvae frequently drop to the ground, the soil under the spread of the branches should be covered by the spray. The chrysalises can be destroyed by deep digging in the late autumn or early spring. Further sanitary measures are suggested.—The Phytopathological Institute of the Agricultural University, Budapest.

1797. FLIPSE, L. P. 634.25-2.78
Een rupsenplaag in perziken, nieuw voor ons land. (A new caterpillar plague of peaches in Holland.)
Fruiteelt, 1948, 38: 276-7, illus.

The appearance of the peach twig borer (*Anarsia lineatella* Zell.) in glasshouses in the neighbourhood of Naaldwijk, S. Holland, is recorded. Its habits and life history are outlined. It damages young shoots and fruits. Satisfactory control measures are not yet known, but some growers have had less severe damage after spraying with 0·1 to 0·15% nicotine. Infested shoots should be removed.

1798. VAN CAUWENBERGHE, E. 634.25-2.78
Perzikmot (*Anarsia lineatella*). (The peach moth.)
Fruiteelt, 1948, 38: 314.

This brief note supplements a previous article by L. P. Flipse (see above, 1797) and shows that the peach moth was known in Belgium 18 years ago. Fumigation with nicotine is recommended for peaches under glass, the first application before blossoming, a second after blossoming, and a third ten days later.

1799. LINDBLOM, A. (KJELLANDER, E.). 632.78: 634.11
Rönnbärsmalen 1946. (The apple fruit miner in Sweden in 1946.)
Växtskyddsnotiser, 1947, No. 2, pp. 27-30.

For the relationship between fruit set in the service berry and damage to the apple crop, see *ibidem*, 1946, No. 2, pp. 21-4; *H.A.*, 16: 1932. The distribution of the pest (*Argyresthia*) in different parts of Sweden in 1946 is discussed. Control with nicotine was attempted, but imports were too low to carry out spraying on anything like a national scale. Where the timing was correct, good results have been reported. However, the author favours the use of DDT and in support he quotes figures from E. Kjellander's paper in *Meddel. från Geigy*, 1947, No. 1. These experiments, carried out in different localities and on different varieties, show that two applications of 1% Gesarol + a 0·1% Geigy spreader will secure practical control. The first application should be made at the beginning of egg laying, the second a fortnight later.

1800. HOUTMAN, G. 634.11-2.78
De appelbladmot (*Simaethis pariana* L.). (The apple leaf moth.)
Fruiteelt, 1948, 38: 313, illus.
The life history of the apple leaf moth or apple skeletonizer, *Simaethis* [*Anthophila*] *pariana*, is outlined. Its larvae attack apple, pear, cherry and peach, particularly the apple varieties Transparent de Croncels and Belle de Boskoop. The author finds its control troublesome but considers that DDT may be effective. He recommends the use of arsenic in the first post-blossom spray.

1801. BORG, Å. 634.75-2.78
Ett beprudningsförsök med DDT- och hexa-preparat mot jordgubbsvecklaren. (Dusting trials with DDT and hexa-preparations for the control of strawberry tortrix.)
Växtskyddsnotiser, 1947, No. 3, pp. 33-6.
In four experimental plots Gesarol (DDT) was found to reduce the number of strawberry tortrix (*Acalypha comariana*) larvae on affected leaves from 116 in the controls to 15. DDT and Gammexane mixtures were somewhat less effective, while Gammexane applied by itself had no influence on the larval population.

1802. KUENEN, D. J. 634.11-2.793
De bestrijding van de appeltaagwesp (*Hoplocampa testudinea* Klug) met hexachlorocyclohexaan. (The control of apple sawfly with 666.) [English summary ½ p.]
Meded. Direct. Tuinb., 1948, 11: 266-74.
Field experiments in Holland with 666 used as a wettable powder (Agrocide W.P.) showed it to be as good as, or even better than the routine lonchocarpus (rotenone) or nicotine spray. In laboratory tests lonchocarpus was strongly ovicidal, while 666 was mostly a larvicide and nicotine intermediate. 666 applied shortly after petal fall kills all larvae tunnelling under the skin of apples and most of those which hatch later.

1803. BESEMER, A. F. H. 632.793: 634.1/2
Ervaringen met nieuwe middelen voor de bestrijding van de zaagwespen van appel, peer en pruim. (Experiments with new preparations for the control of apple, pear and plum sawfly.) [English summary 10 l.]
Meded. Direct. Tuinb., 1948, 11: 275-90.
HCCH [666] preparations are more effective than derris or nicotine and give excellent control of sawfly if applied when the first larvae are seen.

1804. ANON. 634.11-2.793
Bestrijding appeltaagwesp. (Controlling apple sawfly.)
Fruiteelt, 1948, 38: 299, illus.
Discusses the use of nicotine, rotenone- and 666-containing preparations. Five proprietary 666 preparations are mentioned with the concentrations recommended for use. For the control of larvae which have escaped the early applications rotenone has given better results than nicotine or 666.

1805. GAIRAUD, R., AND JOLY, E. 634.13-2.793
Contribution à la biologie d'*Hoplocampa brevis* Kl. sur le poirier, et essais et traitements. (The biology and control of the pear sawfly.)
Rev. hort. Paris, 1948, 120: 74-80, bibl. 3.
The following measures are recommended for the control of the pear sawfly *Hoplocampa brevis* on pears: an arsenical spray, or one containing hexachlorocyclohexane [666] or SPC [a sulphur derivative of 666] applied immediately after petal fall. Varieties in which flowering lasts more than a fortnight should be sprayed 12 to 14 days after flowering starts and again 6 days later.

1806. CHABOSSOU, F. 632.793
Les traitements ovicides contre les hoplo-campe. (Ovicultural treatment for the control of sawflies.)
Rev. hort. Paris, 1948, 120: 147-50, bibl. 4.
Three spray materials are recommended: 666, SPC, and a mixture of derris with sulphonated terpene alcohols. Pears should be treated at the start of petal fall, the Prunier d'Ente from 6 to 12 days after full bloom. The flowers must be thoroughly wetted and a high pressure spray is advised.

1807. VELBINGER, H. H. 634.22-2.793
Prunus avium L. als neue Brutpflanze der Pfauenäugewespe *Hoplocampa minuta* Christ. (*Prunus avium*, a new host of the black plum sawfly.)
NachrBl. Dtsch. PflSchDienst, 1947, 1: 120-1, bibl. 10.
In mixed plum and cherry plantings in Bulgaria cherry fruits were heavily infested with the black plum sawfly, *Hoplocampa minuta*.

Weeds.

(See also 1837, 1939, 2010, 2011, 2183, 2193, 2319, 2329.)

1808. ESFANDIARI, E. 632.53/59(55)
The parasitic phanerogams in Iran. [Iranian, French summary 3 pp.]
Bull. trimest. Dep. gen. Prot. Pl. Tehran No. 3, 1947, pp. 28-39, bibl. 4.
Among the parasitic flowering plants recorded the following are of horticultural significance: *Viscum album* has been observed in Iran on *Pirus malus*, *P. communis* and *Prunus* sp.; *Loranthus grevillei* Boiss. and Buhse on *Pirus communis* and *Amygdalus communis*; *Cuscuta monogyna* on *Vitis* and *Pistacia vera*; *Orobanche aegyptiaca* on solanaceous and cucurbitaceous plants, particularly water melon, cucumber, melon, egg-plant and tomato.

1809. SHERWOOD, L. V., AND FUELLEMAN, R. F. 632.51
Experiments in eradicating field bindweed.
Bull. Ill. agric. Exp. Stat. 525, 1948, pp. 473-506, bibl. 6, illus.
Field bindweed, *Convolvulus arvensis*, can be eradicated in one or two seasons by repeated cultivation to a depth of 3 to 4 in., using a cultivator with overlapping blades. After the roots have been destroyed it is advisable to grow one corn crop so that the bindweed seedlings may be destroyed by continued cultivation. One application of 2,4-D at the flower bud stage will prevent seed formation; but it should be used to supplement control by cultivation. Chlorates are useful for control in inaccessible hedgerows, but they are too expensive and persistent to be used in the field. New infestations should be eradicated as they appear.

1810. ORCHARD, H. E. 632.51: 634.8
Field bindweed (*Convolvulus arvensis*, L.).
J. Dep. Agric. S. Aust., 1948, 51: 373-6, illus.
The field bindweed is widely spread in agricultural areas of South Australia, mainly in vineyards, orchards and gardens. The best methods of eradication are by (a) salting (crude salt at $\frac{1}{2}$ to 1 lb. per sq. ft.), (b) spraying with sodium chlorate (1 lb. for each gal. of water, and 100-300 gal. per acre), (c) spraying with hormone-type herbicides. Methoxone and many of the proprietary weed killers containing 2,4-D have proved effective.

1811. SEXTON, W. A., AND TEMPLEMAN, W. G. 632.954
Differential effect of 2-benzoylbenzoic acid and its derivatives upon plant species.
Nature, 1948, 161: 974.
Attention is drawn to the selective herbicidal activity of 2-benzoylbenzoic acid and some of its derivatives. A seed germination test, measuring the susceptibility of charlock and the resistance of oats to these substances, was used to relate their activity to that of α -naphthalacetic acid. Only 2-(4'-chlorobenzoyl) benzoic acid was found equal in activity to this standard, the other derivatives tested were either less active or inactive. The suggestion is made that the mechanism of growth-inhibition of charlock may be connected with hormonal defunction and evidence in favour is given. In this respect 2: 4: 5-tri-chlorophenylacetic acid is described as a powerful selective herbicide which also produces an epinastic response of oat coleoptiles. J.K.E.

1812. HOLMES, E. 632.954: 577.17
Plant hormones with special reference to selective weedkillers.
Chem. Industry, 1948, No. 23, pp. 355-9.
The development of Chloroxone [2,4-D] and Methoxone [MCPA] as selective weedkillers. Reference is made to their use in the tropics.

1813. PEYER, E. 634.8-2.954
Die Anwendung der Phytohormone als Unkrautvertilgungsmittel in den Reben. (The application of phytohormones as herbicides in vines.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 211-13, illus.
French observations are confirmed by Swiss viticulturists. Weed control by 2,4-D, even at low concentrations, causes deformation of vines.

1814. BLACKMAN, G. E. 632.954
Recent developments in the control of weeds.
J. roy. hort. Soc., 1948, 73: 134-44.
A report of a lecture, given in November, 1947, in which the history of chemical weedkillers is briefly reviewed from Bonnet's discovery, over 50 years ago, that a dilute copper sulphate spray would kill yellow charlock in oats, to some of the latest developments, such as the use of growth substances and of light mineral oils as selective herbicides. These recently discovered herbicides cannot as yet be recommended for general use in gardens—except on lawns, where MCPA is effective in killing creeping buttercup, plantain (*Plantago media*) and daisy (*Bellis perennis*).

1815. LUCAS, E. H., AND OTHERS. 577.17
The effect of buffers on the growth-inhibiting properties of sodium 2,4-dichlorophenoxyacetate.
Quart. Bull. Mich. agric. Exp. Stat., 1948, 30: 289-97, bibl. 5.
In an attempt to explain the increased efficacy of 2,4-D solutions prepared with onion extract (*ibid.*, 1947, 29: 256-62; *H.A.*, 17: 2193), the effect of pH on the action of buffered and unbuffered solutions of sodium 2,4-dichlorophenoxyacetate was investigated. At pH 2 and pH 3 the two solutions inhibited growth equally strongly; but at pH 4, pH 5, pH 6, and pH 7 the effect was much less in unbuffered than in buffered solutions. Neither the acidity nor the buffer system of onion juice accounts for its synergistic action with 2,4-D.

1816. WEAVER, R. J. 577.17: 632.954
Contratoxicification of plant growth-regulators in soils and on plants.
Bot. Gaz., 1948, 109: 276-300, bibl. 14, being *Contr. Hull bot. Lab.* 596.
Contratoxicification is the application of absorbents, adsorbents, or ion exchangers to soils or parts of plants in order to accomplish partial or complete elimination of the toxic effects of plant growth-regulators on plants. The toxicity of 2,4-D in soil was decreased or eliminated by the addition of Zeo-Carb H or Norit A. These substances, when applied to plants as dust or in aqueous suspension, gave some protection against the action of growth substances applied later, or within 15 minutes previously. Test plants included

PLANT PROTECTION OF DECIDUOUS FRUITS

red kidney beans, soya bean, white mustard, and marigold. The isopropyl and butyl esters, and the ammonium, sodium and triethanolamine salts of 2,4-D were used.

1817. BROWN, J. W., AND MITCHELL, J. W. 577.17
Inactivation of 2,4-dichlorophenoxyacetic acid in soil as affected by soil moisture, temperature, the addition of manure, and autoclaving.
Bot. Gaz., 1948, 109: 314-23, bibl. 10.

The rate of inactivation of 2,4-D in soil increased with temperature and soil moisture. The addition of manure hastened the inactivation of 2,4-D in soil low in organic matter. Surface applications persisted longer than those mixed into the soil. The inactivation of 2,4-D in soil was retarded by autoclaving after application.—Beltsville, Md.

1818. JORGENSEN, C. J. C., AND HAMNER, C. L. 632.954: 577.17

Weed control in soils with 2,4-dichlorophenoxyacetic acid and related compounds and their residual effects under varying environmental conditions.

Bot. Gaz., 1948, 109: 324-33, bibl. 5, being
J. Art. Mich. St. Coll. 872.

In Coloma sand all weed seeds, including those of grasses, were killed by the sodium salt of 2,4-D at rates of 8 and 16 p.p.m. of air-dried soils; 2 p.p.m. gave 95 to 98% kill of weed seeds. The rate of inactivation increased with temperature and with the water content of the soil: the growth substances apparently disappeared from water-saturated flats in 3 weeks. On muck soil these low concentrations were ineffective for weed seed control. The practical applications of such low concentrations in sandy soils are discussed.

1819. MINSHALL, W. H. 632.954

Eradication of poison ivy (*Rhus radicans* L.). III.* Further preliminary results with 2,4-dichlorophenoxyacetic acid formulations, ammonium sulfamate, and sodium chlorate.

Sci. Agric., 1948, 28: 140-1, bibl. 1, being
Contr. Div. Bot. Pl. Path. Dep. Agric. Canada
 921.

The methyl ester of 2,4-D was as good as ammonium sulphamate and better than sodium chlorate for controlling poison ivy. 2,4-D, its ammonium and triethanolamine salts were less effective in that order. Applications made in June were more effective than those made later in the season.

1820. BRAID, K. W. 632.51

Bracken control—artificial and natural.
J. Brit. Grassland Soc., 1947, 2: 181-9, bibl. 7,
 illus.

A discussion of methods and machines for eradicating *Pteris aquilina* in Scotland. Experimental results over a number of years are discussed. Cutting experiments showed that, with dense bracken, two cuttings a year, the first in early June and the second six weeks later, had to be continued for about six years before the bracken was eliminated.

Vermin.

1821. WAHLIN, B. 632.693.2: 634.1/2

Några ord om harskador på fruktträd. (Hare damage to fruit trees.)

Växtskyddsnotiser, 1948, No. 1, pp. 8-10.

Preparations of aluminium sulphate, described in the United States as "hare-safe", did not long deter Swedish hares from gnawing the bark, even at a concentration of 5%. A lime paste, to which blood is added, is considered to have a preventive effect, but it must be applied by hand and cannot be sprayed.

* For Parts I and II, see *ibid.*, 1946, 26: 183-93 and 662; *H.A.*, 17: 718 and 719.

1822. TAGHI-ZADEH, F. 634.63-2.693
Glis glis caspicus Satun. (*Myoxidae*). [Iranian, French summary $\frac{1}{2}$ p.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 2, 1946, pp. 23-4.

Glis glis caspicus, the large edible European dormouse, is very destructive to olives in the Roudbar region of northern Iran. It makes a hole in the fruit and eats the kernel. It is a comparatively large dormouse, body length 17 cm. and tail 16.5 cm. Seventeen have been observed on one olive tree.

1823. TAGHI-ZADEH, F. 632.693: 635.1/7
Nesokcia indica Gray. [Iranian, French summary $\frac{1}{2}$ pp.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 4, 1947, pp. 55-7, bibl. 3.

This rodent of the family *Muridae* is considered to be a pest in vegetable gardens, nurseries and orchards. Its biology and distribution are described.

1824. STORER, T. I. 632.693.2
Control of rats and mice.
Circ. Calif. agric. Ext. Ser. 142, 1948, pp. 37, bibl. 15, illus.

The following methods of control, amongst others, are described: exclusion, trapping, poisoning (baits, gases and dusts), flooding, rat virus.

Sprays and spraying.

(See also 1645-1648, 1655, 1661, 1662, 1670c, e, f, g, k.)

1825. FRANSEN, J. J. 632.95
Een eenvoudig doseringsapparaat voor spuitmiddelen. (A simple precision apparatus for the application of sprays.)

Meded. Direct. Tuinb., 1948, 11: 105-10, bibl. 3.

An apparatus is described and illustrated for delivering small quantities (0.1-1.0 c.c.) of fluids as sprays or mists.

1826. WATT, J. H. 634.7-2.95
Equipment for spraying small fruits.
N.Z. J. Agric., 1948, 76: 183-5, illus.

Particularly for raspberries. A layout is illustrated designed to facilitate spraying by two men with a portable outfit, one with 50 ft. and the other with 100 ft. of hose. An adjustable boom system is described.

1827. TUNBLAD, B. 632.943
Nya puderspridare. (New dusting apparatus.)
Växtskyddsnotiser, 1948, No. 2, pp. 27-8, illus.

One model, mounted on two wheels, like a small seed drill, is suitable for treating root crops, cabbages, peas, etc. The other is portable and can be used with advantage on shrubs and small fruit, including strawberries.

1828. YADOFF, O. 632.951: 631.588.1
Sur le poudrage électrique des végétaux au moyen de mélanges de poudre et de composés organiques complexes. (Electrostatic dusting of plants with mixtures of dusts and complex organic compounds.)
C.R. Acad. Sci. Paris, 1947, 224 (?): 1001-3, bibl. 2.

In the author's apparatus the dust is allowed to fall into a special chamber traversed by the air feed pipe, which ends in the delivery tube. Air pressure and rate of discharge of the dust can be regulated. Some idea of its performance is given by the following figures: finely powdered sulphur, discharged at the rate of 3 g./sec. and propelled by an air pressure of 4.5 kg./cm.², left the outlet at a speed of 420 m./sec.; the dust jet acquired a charge of 14,200 volts. Other materials acquired lesser charges. Moisture greatly affects the charge.

PLANT PROTECTION OF DECIDUOUS FRUITS

1829. FRANSEN, J. J. 632.943: 631.588.1
De invloed van de relatieve luchtvochtigheid op de elektrische lading van stuifpoeders in Nederland. (The influence of relative humidity of the air on the electrical charges of dusts in Holland.)
Meded. Direct. Tuinb., 1948, 11: 400-5.

The author studies the atmospheric humidity in Holland in relation to the statements that the electric charge of dusts used in plant protection is an important factor in the adhesiveness and distribution of the dusts and that this charge is effective only when the relative humidity is below 50%. He concludes that because of the comparatively high humidity of the air in Holland the electric charge of dust particles is not likely to have much effect.

1830. HUS, P. 632.4.1/8-2.95
Winterbespuitingen. (Winter spraying.)
Tuinbouw, 1948, 3: 45-8.

The author reviews the merits and disadvantages, for winter spraying fruit trees, of (1) fruit tree carbolineum, (2) mineral oils, (3) mixtures of 1 and 2, (4) dinitro cresol preparations, (5) mixtures of 2 and 4, (6) mixtures of 2, 4 and DDT, (7) mixtures of tar-oil products and DNC.

1831. HALLEMANS, A. 632.95: 634.1/2
Beschadiging op fruitgewassen door spoeimiddelen. (Damage to fruit by spraying.)
Cultuur Hand., 1948, 14: 236-9, illus.

Describes and illustrates the damage that may be caused to foliage and fruit of fruit trees by certain preparations used separately and in combination.

1832. RIPPER, W. E., AND TUDOR, P. 656.7: 632.95
The development of a helicopter spraying machine.*
Bull. ent. Res., 1948, 39: 1-12, bibl. 10, illus.

An account of experiments using special spraying gear designed for the Sikorski Y.R. 4B helicopter. Good cover of all surfaces of the crop plants was obtained when the machine was flown at a speed of 6 to 8 m.p.h. with the boom a few feet above the ground; the spray is discharged in the front sector of the slip-stream. Good coverage was not obtained in wind velocities exceeding 12 m.p.h. This machine could carry a useful load of only 250 lb., and economic working would only be possible with a much greater load.—Pest Control Ltd., Harston.

1833. ANON. 656.7: 632.95
Spraying from helicopter.
The Times, London, 1948, 12th June.

An account of a public demonstration of the use of the helicopter, a Westland Sikorsky S51, for spraying crops. The spray boom is arranged in the slip-stream from the rotor, and as the helicopter flies slowly a few feet above the plants the slip-stream deposits the spray on the underside of the leaves as it rebounds from the ground.—Pest Control Ltd., Harston.

1834. MAAN, W. J. 656.7: 632.95
Helicopter-onderzoek ten behoeve van land-, tuin- en bosbouw in Nederland. (The use of the helicopter for field, garden and forest plants in Holland.)
Meded. Direct. Tuinb., 1948, 11: 365-8.

An account of preliminary trials in Holland with a Sikorsky S51 helicopter for applying sprays to field crops, with a discussion of its possibilities.

1835. AHLBERG, O. 634: 632.95: 656.7
Flygbepudring av fruktträdgårdarna på Visingsö. (The dusting of orchards by helicopter in Visingsö, Sweden.)
Växtskyddsnotiser, 1947, No. 4, pp. 49-53.

Caterpillars caused severe damage in the Crown forests and orchards of Visingsö, Sweden, in spring, 1947, the winter

moth being the most harmful of the orchard pests. The affected area, about 150 hectares, was dusted with DDT from a helicopter at the rate of 10 kg. of Gesarol per hectare. Preliminary counts of chrysalises in the soil towards the end of June did not give any indication of the result of the treatment, since all those found had begun to pupate before the dusting was carried out. However, grease bands round the trees in autumn should have made more extensive counts possible this spring, and success will be evaluated by the damage caused in the 1948 season. Apparently bees remained unaffected as there were no bee plants flowering in the orchards at the time of dusting. Although pears are supposed to be less liable to winter moth attack than other fruit kinds, they were nevertheless eaten bare by the larvae. Even fir trees suffered severely.

1836. MAAN, W. J. 632.95: 656.7
De helikoptère als bestrijdingswerkzeug. (The helicopter in plant protection.)
Tuinbouw, 1948, 3: 49-53, illus.

The use of helicopters for the distribution of sprays and dusts is discussed, and the advantages over aeroplanes and orchard machines are pointed out.

Fungicides.

(See also 1874.)

1837. H., M. T., AND OTHERS. 632.952 + 632.954
Some new (and old) fungicides and herbicides (4th ed.).
(Publ.) *Me agric. Exp. Stat.*, 1948, 12 pp., bibl. 6.

A list of substances used for: apple spraying, herbicides, potato spraying, potato seed treatment, soil treatment, seed treatment (dormant seeds) and vegetable spraying. Their uses, composition, trade names, and the companies making them are given. Materials of composition unknown to the authors are omitted. Some chemical formulae are given in an appendix.

1838. TILEMANS, E. 632.952
Les composés organo-cupriques. (The organo-cupric compounds.)
Parasitica, 1948, 4: 21-6.

A review of the composition and properties of some recently introduced fungicides.

1839. LATHROP, F. H., AND HILBORN, M. T. 634.11: 632.95
Recent advances in spray practices for Maine apple orchards.
Bull. Me agric. Exp. Stat. 457, 1948, pp. 325-53, bibl. 3.

The relative merits of the following fungicides are discussed—Paruzated (agricultural spray and 806), Fermate, Phygon, copper 8-quinolate, the glyoxalidines, and Good-rite (polyethylene polysulphide). Recommendations are made for the control of apple scab, oyster-shell scale, leaf hopper, European red mite, and apple fruit fly. Recently developed spray booms are described. Investigation of apple foliage indicates that the deposit of active material is best increased by raising the concentration of a spray, or the total amount of a dust.

1840. BLUMER, S., AND ZÄCH, C. 634.1/2-2.952
Die Verwendung von Netzschwefelpräparaten im Obstbau. (Spraying fruit trees with wettable sulphur preparations.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 91-4, 111-14, bibl. 5.

Although in Switzerland no spray injury has been observed as a result of lime-sulphur application, a number of wettable sulphur preparations were tested at Wädenswil. Since there was only a mild incidence of scab, conclusive results have not yet been reached. Tests carried out with the same

* See also 1734.

PLANT PROTECTION OF DECIDUOUS FRUITS

compounds for the control of mildew, prevalent on account of the dry season, were promising. Two trade preparations of wettable sulphur were approved.

1841. PALMITER, D. H. 634.11-2.952
Some effects of fungicides on yield, quality, and

maturity of apples in 1947.

Abstr. in *Phytopathology*, 1948, 38: 315.

Notes on relative control and on the effect on the trees (leaf injury, leaf size, fruit size, russet) from the application of some of the newer fungicides.

1842. MCGOWAN, J. C., BRIAN, P. W., AND HEMMING, H. G. 632.952

The fungistatic activity of ethylenic and acetylenic compounds. I. The effect of the affinity of the substituents for electrons upon the biological activity of ethylenic compounds.

Ann. appl. Biol., 1948, 35: 25-36, bibl. 9.

Over 80 compounds have been assayed for fungistatic activity using *Fusarium graminearum*, *Penicillium digitatum* and *Botrytis allii* as test organisms. Results suggest that the fungistatic activity is associated with the tendency of the substituents to withdraw electrons from the double bond; thus nitroethylenes and fumarates are fungistatic. Tetraiodoethylene has high activity, but this can hardly be attributed solely to the withdrawal of electrons from the double bond by the iodine atoms.—Butterwick Research Laboratories, The Frythe, Welwyn, Herts.

1843. GROVE, J. F. 632.952

The fungistatic activity of ethylenic and acetylenic compounds. II. Esters of halogenofumaric acids and acetylene dicarboxylic acid.

Ann. appl. Biol., 1948, 35: 37-44, bibl. 21.

The lower halogeno- and thiocyanofumarates and acetylene dicarboxylates are highly fungistatic.—Butterwick Research Laboratories, The Frythe, Welwyn, Herts.

1844. RECKENDORFER, P. 632.952

Immunisierung als Folge von Schädlingsbekämpfung. Ein mikrochemischer Beitrag zur Kenntnis des "eingeschwemmten" Kupfers. (Immobilization as a result of spraying. A microchemical contribution to the subject of "infiltrated" copper.)

PflSchutz Ber., 1947, 1: 65-81, bibl. 18.

The problem has been studied whether the copper deposit on sprayed leaves will give rise to copper ions which infiltrate the tissue, thereby imparting immunity to fungus attack to the cells. The conclusion drawn from microchemical investigations is that copper infiltration does in fact take place and that the threshold value of a copper deposit of 10^{-6} per cell is at the same time the optimum value. A copper deposit of this order should be sufficient to render the cell immune to the germinating tube of a fungus spore. The experiments were carried out with bean leaves at the State Institute for Plant Protection, Vienna.

1845. LITTLE, J. E., SPROSTON, T. J., AND FOOTE, M. W. 632.952

Isolation and antifungal action of naturally occurring 2-methoxy-1,4-naphthoquinone.

J. biol. Chem., 1948, 174: 335-42, bibl. 34.

An extract from *Impatiens balsamina* containing 2-methoxy-1,4-naphthoquinone as the active agent proved antibiotic against *Sclerotinia fructicola*, *Colletotrichum lindemuthianum* and other pathogenic fungi and bacteria. The LD₅₀ values against *S. fructicola* for the natural and synthetic 2-methoxy-1,4-naphthoquinone were 0.00365 mg. per ml. and 0.00310 mg. per ml. respectively. The substance was non-toxic to young tomato and bean plants. It is suggested that the compound, the synthesis of which is relatively simple, would have value as a fungicide.—Vermont Agricultural College, Burlington.

1846. HOWARD, F. L., AND SCHLENKER, F. S.

634.11-2.952

Magnitude of residues on apples from orchards sprayed with organic mercurials.

Proc. Amer. Soc. hort. Sci., 1947, 50: 81-4, bibl. 4, being *Contr. Rhode Isl. agric. Exp. Stat.* 696.

Figures are given showing the quantity of mercurial residue which may be expected on apples sprayed with certain fungicides applied in various concentrations at specified intervals.

Insecticides and insecticidal plants.

(See also 1875, 1876, 2032, 2252, 2323, 2329, 2333, 2334.)

1847. SEIFERLE, E. J., AND FREAR, D. E. H. 632.951
Insecticides derived from plants.

Industr. Engng Chem., 1948, 40: 683-91, bibl. 194.

Methods, and tobacco alkaloids, pyrethrum, rotenone, sabadilla and hellebore, ryania, quassia, yam bean and miscellaneous.

1848. LEEFMANS, S. 632.951

Hexaethyl-tetraphosphaat, een belangrijk nieuw insecticide. (Hexaethyl-tetraphosphate, an important new insecticide.)

Meded. Direct. Tuinb., 1948, 11: 183-7.

An account of HETP (particularly the proprietary preparation Mortopal) with regard to its physical properties, its application, the pests against which it is effective, and its phytocidal action. Because of its poisonous nature growers are earnestly advised to use it with caution.

1849. TRULLINGER, R. W. 632.951

New insecticide.

Report of the Administrator of Agricultural Research 1947, *Office Exp. Stats.*, U.S.D.A., Wash., 1948, pp. 356, 60 cents.

The new insecticide Colorado 9 (a bromo analogue of DDT) is like DDT in many respects, but unlike it in that it has no depressing effect on the bacterial nodules of legumes. Leafhoppers and other serious insect pests of legumes can now be controlled without loss of the nitrogen-fixing capacity of these plants.

1850. ROSS, W. A. 632.951

Newer insecticides.

Canad. Gr., 1948, 71: 3: 10-13.

An account of the horticultural possibilities and limitations of the newer insecticides in Canada.

1851. QUINTANA Y MARI, A., AND CID CAPELLA, A. M. 632.951

Una nueva reacción colorimétrica del p,p'-DDT.

(A new colorimetric reaction of p,p'-DDT.)

Bol. Inst. Invest. agron. for. Madr., 1946, No. 15, pp. 229-51, bibl. 23.

The authors describe a technique and optimum conditions of a specific colour reaction for p,p'-DDT based on alcoholic N/2 solution of KOH in an alcoholic solution of a tetranitrated product of p,p'-DDT.

1852. LEEFMANS, S. 632.951

Toxaphene, een nieuw veelbelovend insecticide. (Toxaphene, a very promising new insecticide.)

Meded. Direct. Tuinb., 1948, 11: 263-5.

A review of work on Toxaphene (chlorinated camphene) in America. It compares favourably with DDT but is slower in action. The author concludes that more work on it is necessary before it can be generally recommended.

1853. LEEFMANS, S. 632.951

Thiophos 3422 (Parathion), een der nieuwste insecticiden. (Thiophos 3422 (Parathion), one of the latest insecticides.)

Meded. Direct. Tuinb., 1948, 11: 310-14.

An account of Thiophos 3422, its chemical composition

PLANT PROTECTION OF DECIDUOUS FRUITS

(it is said to be o-o-diethyl-ortho-para-nitrophenyl-thiophosphate) and its properties. Insects that appear to be very sensitive to its action are mentioned; it is particularly effective against greenhouse pests, and against the peach aphid, *Myzus persicae*.

1854. DE WILDE, J. 632.951
Over de ontdekking en enkele eigenschappen van het insecticide hexachloor-cyclohexaan. (The discovery and some properties of HCH.) [English summary 71.]

Meded. Direct. Tuinb., 1948, 11: 304-9, bibl. 6.

The history of the discovery of HCH and its use as an insecticide is reviewed. Its disadvantages and the possibility of its use for controlling pests resistant to DDT are mentioned.

1855. WAY, M. J., AND SYNGE, A. D. 632.951: 638.12
The effects of D.D.T. and of benzene hexachloride on bees.

Ann. appl. Biol., 1948, 35: 94-109, bibl. 9.

BHC is a powerful contact and stomach poison and is dangerous to foraging bees. A few minutes' contact with treated surfaces is sufficient to cause death, and blossom may remain poisonous for at least 3 days after treatment. DDT has contact action at fairly high concentrations and as a stomach poison is rather more toxic than lead arsenate, but in the field commercial preparations on open blossoms are apparently harmless to bees.—Rothamsted Experimental Station.

1856. HAMMER, O., AND KARMO, E. 638.12: 632.95
Studier over de kemiske Plantebeskyttelsesmidlers Giftighed over for Honningbier. (Studies on the toxicity to bees of plant protective chemicals.) [English summary 4 pp., figures and tables with explanation in English.]

Tidsskr. Planteavl., 1947 (?), 51: 247-309, bibl. 34.

Reports from bee keepers and numerous observations and laboratory trials by the authors render it fairly certain that under Danish conditions poisoning of bees occurs only as a result of dusting and—to a smaller degree—spraying plants during blossoming. During the war, damage to bees increased as fruit growers began to use calcium arsenate instead of lead arsenate. Also zinc arsenate, which is more generally used now, was found to be rather toxic in spite of its lower content of water-soluble arsenate. DDT, even when blossoming plants were treated, gave no cause for complaint. The lethal concentration of a number of insecticidal chemicals has been worked out in the laboratory. Gammexane proved very toxic to bees as a contact, stomach and respiration poison. 2,4-D is safe to use at concentrations needed for weed killing.—State bee trials, Lyngby.

1857. CARTER, R. H. 632.951
DDT residues in agricultural products.

Industr. Engng Chem., 1948, 40: 716-17, bibl. 8.

Absorption and translocation of DDT in vegetables is negligible. When DDT is applied to oranges it can be recovered only from the rind.

1858. PETTY, B. K. 632.951
Laboratory apparatus and technique for the evaluation of the toxicity and adhesiveness of insecticides.

Sci. Bull. S. Afr. Dep. Agric. 267, 1946, 15 pp., bibl. 2, being Ent. Ser. No. 20.

Three pieces of apparatus are described and figured, viz. a dusting chamber, apparatus for testing contact sprays and the adhesiveness of insecticidal dusts.

1859. BRANN, J. L. 634.1/2-2.951
New methods for the application of insecticides to fruit trees.

Proc. 93rd Ann. Meet. N. York St. hort. Soc.,

1948, pp. 100-5.

Seven experiments carried on in six different apple orchards

during 1946 and 1947 produced evidence to indicate that the application of dormant oil emulsions in the form of mists may be an efficient and economical method of making such treatments. The amount of oil deposited per unit of bark surface for any given size of tree was found to be correlated with the amount of actual oil applied rather than with the concentration of oil in the mist. The most effective and efficient concentration of oil used was the 25% emulsion. Compared to conventional sprays the mist applications required 1/15th to 1/20th the amount of total liquid and one-third to one-half the amount of actual oil per tree to produce an equivalent oil deposit. In one case where there was a heavy population of red mite eggs on the rough bark of the tree trunks, some difficulty was experienced in obtaining an effective oil deposit on these eggs. However, where oil deposits were comparable the red mite control was similar whether the material was applied with a high pressure sprayer or in the form of a mist. The technique is new and it will require more experimentation before it is developed to the point where it can be safely recommended as a general practice. [From author's summary.]

1860. SALTER, R. M. 615.779.1: 632.951
Toxicity of pyrethrum flowers not greatly affected by drying methods.

Report of the Administrator of Agricultural Research 1947, Bur. Pl. Industry, Soils and agric. Engng., U.S.D.A., Wash., 1948, p. 314, 60 cents.

"Recent experiments have shown that contrary to prevailing opinion, pyrethrum flowers have a wide latitude in respect to temperature and other conditions for drying without greatly altering their insecticidal properties. Drying at temperatures as high as 300° F. is without significant effect on insecticidal value. The flowers immediately after picking may be packed in sealed containers and kept in that condition for several months and then dried without loss of potency. They may be placed in heaps or bins for several days and then dried rapidly without reducing their insecticidal value, provided there has been no excessive molding, even though they heat up to some extent under such conditions. These treatments and methods result in discolored products that would make them unsatisfactory for use in insect powder but do not affect their usefulness for spray extracts. The crop can thus be handled with drying facilities of smaller capacity than has been considered necessary to prevent loss of insecticidal value. However, growers would have to meet the requirements set by manufacturers of spray extracts in order to market their crop."

1861. HENDERICKX, J. 615.779.1
Le système radiculaire de *Chrysanthemum cinerariaefolium*. (The root system of *C. cinerariaefolium*.)

C.R. Semaine agric. Yangambi, 1947, pp. 417-19, illus., being *Commun. 25*.

Remarks concerning the influence of soil type on the development of pyrethrum roots. Suggestions are made for the improvement of yields, and *Crotalaria agathiflora* is recommended as a fallow. At Mulungu the optimum planting distance is 60 × 45 cm.

1862. ENGELBEEN, M. 615.779.1: 632.951
La culture de pyrèthre et la conservation du sol. (Pyrethrum growing and soil conservation.)

C.R. Semaine agric. Yangambi, 1947, pp. 74-82.

Choice of soil, strip cropping, spacing, selective weeding, fallows.

1863. KROLL, U. 632.951: 615.779.1
The germination of pyrethrum seed.

Kenya Pyrethrum News, 1948, 3: 3: 10.

It is not always easy to explain the apparently erratic behaviour of pyrethrum seed but the importance of two factors, maturity and temperature during germination, can be regarded as established. The results of trials are quoted

PLANT PROTECTION OF DECIDUOUS FRUITS

which show: (1) a steady monthly increase in the percentage germination of pyrethrum seed sown from one month after harvest (18-75%) to 10 months later (45%), and (2) the results of germination at various temperatures (no germination at 30° C. and over 49% at 15° C.). Maturation of seed was not hastened by chemical or hot water treatment. It is recommended that nursery beds be protected from direct sunrays and the soil temperature kept low, not above 20° C. (68° F.). The practice of spreading thatch on seed beds to assist germination is recommended. The mixture of wood ashes with the seed before sowing was found not to affect germination adversely.

1864. ANON. 632.951

Lonchocarpus—a source of rotenone.

Foreign Agric., 1948, 12: 62, illus.

A brief note on the production and use. Despite competition from synthetic insecticides, such as DDT, the U.S.A. imported 11 million lb. of rotenone-bearing roots from the Americas in 1946, 96% of which came from Peru, the chief commercial producer of lonchocarpus.

1865. TONDEUR, R. 632.951

Rapport sur des analyses chimiques de racines de derris montrant l'existence d'une variation des teneurs suivant le diamètre et l'âge des racines. (Analyses of derris roots showing the connexion between the diameter and age of roots and [their rotenone] content.)

C.R. Semaine agric. Yangambi, 1947, pp. 725-8, being Commun. 52.

Analyses of a limited range of samples indicate a high rotenone content in the eleventh month after planting; this peak may, however, be connected with the weather. In general, the ratio, rotenone : total chloroform extract, is higher in the finer roots, but is independent of age. To decide the optimum period for the crop, representative plots should be harvested monthly from the tenth month for determination of dry weight and rotenone content of roots. Root development depends on altitude; such experiments should therefore be repeated at different stations.

1866. WHITE, D. G. 632.951: 631.535

Propagating derris by cuttings.

Agric. Amer., 1945, 5: 154-6, bibl. 1, illus. [received 1948].

Cuttings 8-12 in. long, with at least 2 buds, are prepared from lengths of mature stem, shortly before planting them in raised nursery beds. The base of each cutting should be not less than 1-2 in. below a leaf scar. In planting the top bud must be at least 1 in. above the soil and should point upwards. Leafless cuttings from stems of 0.78 in. diameter, or larger, are said to give better results than those from stems of 0.4 in. or less. Beds should be shaded and frequently irrigated in the dry season. Large cuttings are generally ready for transplanting within 3 months. Rooted cuttings are spaced 2 ft. × 3 ft. in the field.—Fed. Exp. Stat., Puerto Rico.

1867. WHITE, D. G., PAGÁN, C., AND JONES, M. A. 632.951: 631.535

Production of *Derris elliptica* in relation to type of cutting and age at harvest.

J. agric. Res., 1948, 77: 13-24, bibl. 9.

An experimental study was made of the relation between yield of roots, rotenone, rotenone plus rotenoids, and chloroform extractions of *Derris elliptica* propagated from 5 types of cutting and harvested at intervals up to 32 months. The largest percentage of rotenone occurred in roots harvested 26 months after planting. There were no differences in yields of roots among the types of cuttings within each harvest 14 months after planting and thereafter. Small and medium leafless cuttings produced roots inferior to those from leafy or large leafless cuttings. The total

yield of rotenone from each harvest was significantly higher than that from the previous harvest, hence the optimum age at harvest is 32 months or longer after the planting of cuttings.

1868. McCULLOCH, R. N., AND WATERHOUSE, D. F. 595.771: 632.951

Laboratory and field tests of mosquito repellents.

Bull. Coun. sci. industr. Res. Aust. 213, 1947, pp. 28.

Both dimethyl phthalate and 612 (2-ethylhexane-1,3-diol) gave nearly complete protection against bites of *Anopheles* and *Aedes* spp. for 45-60 minutes under the most severe conditions. Under similar conditions, Ceylon citronella oil gave protection for no more than 20 minutes.

1869. v. BRONSART, H. 634.8-2.944

Über die Mobilisation unlöslicher Metallverbindungen im Boden durch Bodenentseuchungsmittel. (The mobilization in the soil of insoluble metal compounds by soil disinfectants.)

Nachr. Bl. disch. PfSchDienst, 1947, 1: 115-16.

Soil fumigation with carbon disulphide after the scrapping of a vineyard allows immediate replanting to vines and increases fertility. In the Palatinate, for instance, vineyards treated 40 years ago still show more vigorous growth than surrounding plots. In many parts of Germany it takes from 10 to 60 years to overcome soil sickness in the apple plots of a nursery if no soil disinfection is carried out. It is suggested that one of the effects of soil fumigation with carbon disulphide or with formalin and of soil sterilization by heat is the mobilization of trace elements in the soil.

Noted.

1870.

a ANON. 632.654.2: 632.951

Foliol and Shellestone for red spider control (a report on trials in 1947).

Tech. Inform. Sheet Shell Chemicals Ltd. 257, 1948, 7 pp.

Successful trials are reported.

b ANON. 632.3/7(489)

Plantesygdomme i Danmark 1945. Aaroversigt samlet ved Statens plantepatologiske Forsøg. (Plant diseases and pests in Denmark 1945.) [English summary 6 pp.]

Tidsskr. Planteavl., 1947 (?), 51: 373-437.

A report compiled by Statens plantepatologiske Forsøg.

c BAKKER, M., AND KLINKENBERG, C. H. 634.75-2.3

Onderzoek over grondbacteriën en wortelrot van aardbeien in Canada. (Investigations on soil bacteria and rootrot of strawberries in Canada.) *Tijdschr. PlZiekt.*, 1948, 54: 23-8, bibl. 9.

A review with comments.

d BERAN, F. 632.951

Neue Wege im Pflanzenschutz. I. Synthetische Insektizide. (New methods in plant protection. I. Synthetic insecticides.)

Bodenkult., 1947, 1: 56-68, bibl. 67.

e BERAN, —. (GEIER, P.). 632.752

La pou de San-José en Autriche. (The control of San José scale in Austria.)

Rev. romande Agric. Vitic., 1948, 4: 29-31.

f BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, U.S.A. 632.76

Japanese beetle.

Picture Sheet U.S. Dep. Agric., No. 4, 1948, 2 pp.

g CAMPBELL, J. C., AND PEPPER, B. B. 633.491-2.951/2
Promising new chemicals for the control of diseases and insects.
Amer. Potato J., 1948, 25: 82-6.

h CURRIE, B. W. 632.111(712)
The vegetative and frost-free seasons of the prairie provinces and the northwest territories.
Canad. J. Res., 1948, 26, Sec. C, pp. 1-14, bibl. 8.

i HALLEMANS, A. 632.95: 634.1/2
Sproeiwerk tussen slapende bot en ontloken bloesems. (Spraying between the dormant bud stage and blossoming.)
Cultuur Hand., 1948, 14: 108-10, 128.

j HILBORN, M. T., AND OTHERS. 634.11: 632.94
Two homemade spray booms for Maine apple orchards.
Bull. Me agric. Exp. Stat. 458, 1948, pp. 355-69.

k KLINKOWSKI, M. 632.95
Feld und Garten in der Tasche VI. Schädlinge und Krankheiten an Gemüse und Obst. (Field and garden in the pocket VI. Pests and diseases of vegetables and fruit.)
J. Boehmer, Berlin-Lichterfelde, 1947, 4 pp., 80 Pf.
A pocket spray calendar.

l MCCALLAN, S. E. A. 632.4
Characteristic curve for the action of copper sulfate on the germination of spores of *Sclerotinia fructicola* and *Alternaria oleracea*.
Contr. Boyce Thompson Inst., 1948, 15: 77-90, bibl. 13.

m MARCHIONATTO, J. B. 632.9(82)
Plan nacional de lucha contra las plagas de la agricultura. (National plan for the control of agricultural pests and diseases.)
Rev. argent. Agron., 1948, 15: 73-80, bibl. 7.

n PÄHLMAN, A. 634.1/8: 398
Gamla talesätt och ordspråk om vind och väder, frukt och fruktodling. (Old sayings and proverbs on wind and weather, fruit and fruit-growing.)
Sver. pomol. Fören. Årsskr., 1947, 48: 148-58.

o SCHLUMBERGER, — 632.95(443)
1898-1948, ein halbes Jahrhundert deutscher Pflanzenschutzforschung. (1898-1948, half a century of German plant protection research.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 133-4.

p SCHÖNBRUNNER, J. 632.3/7(436)
Wichtige und auffallende Krankheiten und Schädlinge an Kulturpflanzen in Österreich im Jahre 1947. (The most important diseases and pests of cultivated plants in Austria in 1947.)
PflSchutz Ber., 1948, 2: 43-7.

q SYLVESEN, E. 632.78
Undersökningar över gammaflytet, *Phytometra gamma* L. (Investigations on the gamma moth, *Phytometra gamma* L.) [English summary 7 pp.]
Meddel. Växtskyddsanst. Stockh. 48, 1947, pp. 42, bibl. 23, illus.

r WENZL, H. 519: 632.1/9
Zur Anwendung der Fehlerwahrscheinlichkeitsrechnung im Pflanzenschutzversuch. (The application of statistical methods in plant protection trials.)
PflSchutz Ber., 1947, 1: 49-59, bibl. 7.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS.

General.

(See also 1549, 1551, 1552, 1557, 1558, 1560, 1577, 1584-1589, 1596h.)

1871. LAMM, R., TOMETORP, G., AND HINTZE, S. 635.1/7(485)

Klassificerande sort- och stamförsök med köksväxter. (Vegetable variety trials in Sweden 1945-47.) [English summary, 2½ pp.]

Meddel. Statens Trädgårdsförs. 43, being reprint from *Årsskr. Alnarpars Lanbr.-Mejeri-Trädgårdssinst.*, 1947, pp. 229-78, bibl. 11.

A description of new vegetable varieties and strains adjudicated "first-class élite" or "first-class" after 3 years' testing at Alnarp.

1872. HANSEN, C. M., BARRONS, K. C., AND FRENCH, G. W. 635.1/7: 632.183

The chemical control of grain windbreak rows in muck crops.

Quart. Bull. Mich. agric. Exp. Stat., 1948, 30: 309-16.

When windbreak rows of grain interplanted to protect row crops such as onions have outlived their function, they can be controlled by a spray of dinitro-o-secondary-butyl phenol. The design of hoods to confine the spray to the grain is discussed. The use of a contact herbicide gives added protection to the soil, reduces costs, and facilitates removal of the windbreak.

1873. REED, H. S., AND DUFRENOY, J. 631.811: 635.1/7

Regression curves of plant growth on the levels of an essential micronutrient.

Soil Sci., 1948, 65: 291-5, bibl. 7.

Data and graphs are presented for experiments with peas in relation to zinc, and sunflower and radish plants in relation to boron. The discussion is an attempt to rationalize some concepts of plant growth.—University of California.

1874. ROWELL, J. B., AND HOWARD, F. L.

632.952: 635.1/7

Air blast application of oil-soluble fungicides to row crops.

Abstr. in Phytopathology, 1948, 38: 315.

Experiments with a "Miss Blower" mounted on a row-crop 2-wheel tractor. Oil-soluble fungicides were applied with slight or no injury to field plots of potato, tomato, cucumber, and snap bean. Bean anthracnose was controlled with Mycotox-4 (substituted phenyl ester) and Onyx DL-1 (didodecyl dimethyl ammonium bromide) carried in 3 gal. of Shell Horticultural base oil No. 7 per acre. Cucumber downy mildew infection was decreased 25% by fungicide-oil mist treatment.

1875. STOKER, R. I.

635.6/7: 632.951
The phytotoxicity of D.D.T. and of benzene hexachloride.

Ann. appl. Biol., 1948, 35: 110-22, bibl. 1, illus.

Spraying with two preparations of D.D.T. had a negligible effect on the maturation of outdoor tomatoes and of summer cabbage. Spraying with a commercial D.D.T. suspension damaged cucurbits and treatment with the suspension base distorted glasshouse cucumbers during one season only. Benzene hexachloride (B.H.C.) sprays did not affect the yield or flavour of tomatoes, but at concentrations higher than those normally used they severely scorched radish, turnip, swede, kale, spinach and beetroot seedlings. The application of B.H.C. dusts stunted seedlings of radish. On one occasion young potato foliage was damaged by

relatively high concentrations of two compounded B.H.C. sprays and by B.H.C. dust, but late-season older foliage was unaffected. A spray compounded from B.H.C. dispersible powder caused tainting of potatoes, peas, carrots, beetroot, marrows, cauliflowers and lettuce. Apples and plums treated with B.H.C. spray preparations developed a taint after cooking. [Author's summary.]—Rothamsted Experimental Station.

1876. CLAYTON, C. N., AND ELLIS, D. E.

632.651.3: 635.1/7

Benzene hexachloride fails to control the rootknot nematode.

Plant Dis. Repr., 1947, 31: 487-9.

Plots were treated with Gamtox (mixed with soil and applied at 25, 75, 225 and 675 lb. Gamtox per acre), sown with bean, squash and okra seeds, and planted with tomatoes. The data showed that the treatment reduced emergence of seedlings, caused extreme stunting of those plants which did emerge, and failed to reduce incidence of rootknot.

Garden vegetables.

(See also 1577, 1579, 1580-1583, 1595, 1857, 2056a, d, p, t, v, w, 2057a, e, h, 2297, 2302, 2305, 2310, 2320, 2322, 2323-2328, 2331, 2337, 2339.)

1877. HEIBERG, B. C., AND RAMSEY, G. B.

635.11: 632.4

Phoma rot of garden beets.

Phytopathology, 1948, 38: 343-7, bibl. 8.

In infection experiments with spores of *Phoma betae*, plants 2 months old developed leaf spots in the older leaves, while younger plants were not infected. In germination tests 20 to 50% of the seedlings were killed by this fungus.—U.S. Department of Agriculture, and University of Chicago.

1878. COUTURIER, A., AND SOULIE, H. 635.11: 632.78

Observations préliminaires sur la teigne de la betterave (*Phthorimaea ocellatella* Boyd). (The beetroot moth.)

C.R. Acad. Agric. Fr., 1948, 34: 612-17.

The distribution of the beetroot moth in France and the rest of Europe, its life history and the type of damage caused, are described. Control can be effected by contact insecticides (synthetic organic preparations or rotenone) applied about the end of April, or beginning of May, and repeated if necessary.

1879. SMITH, W. H. 635.13-1.563

Storage of carrots.

Agriculture, Lond., 1948, 55: 119-24, bibl. 3.

The results of experiments showed that a temperature of 34° F. was the best for storing carrots. Gas storage was not found to be suitable. Observations on the distribution of temperature in experimental clamps and on wastage led to the conclusion that carrot clamps should not be built on a base wider than 4 feet and that there should be a 4-12 inch covering of soil without straw. In the light of experimental evidence, other factors such as variety, soil type, manurial treatment, and amount of carrot fly maggot infestation, and the date of drilling and digging, are discussed in relation to wastage. [Author's summary.]—Ditton Laboratory, East Malling, Kent.

1880. MCKILLCAN, M. E. 664.84.13

The stability of carotene in carrots during storage. *Sci. Agric.*, 1948, 28: 183-4, bibl. 8, being *Sci. Contr. Div. Chem. Sci. Serv. Dep. Agric. Canada* 146.

During the winter there was an apparent increase in the carotene content of carrots stored in a cellar.

1881. GANE, R. 664.84: 581.032

The effect of temperature, water content and composition of the atmosphere on the viability of carrot, onion and parsnip seeds in storage. *J. agric. Sci.*, 1948, 38: 84-9.

From the data given it appears that at 20° C. a humidity of 30% would be quite safe for carrot, onion and parsnip seed for periods of 2½-3 years.

1882. HERVEY, G. E. R., AND SCHROEDER, W. T.

635.13: 632.8

Factors influencing the control of carrot yellows with DDT.

Abstr. in Phytopathology, 1948, 38: 314.

DDT applied during the peak period immediately reduced the insect population (including *Macrosteles divisus* (Uhl.) the vector of carrot yellows) almost to nil, but it built up rapidly again by migration. Sprays were more effective than dusts, particularly when used with an adhesive.

1883. LINN, M. B., AND NEWHALL, A. G.

635.25: 632.4

Comparison of two methods of pelleting onion seed in the control of smut.

Phytopathology, 1948, 38: 218-21, bibl. 3.

The object of pelleting is to add bulk to light seed and to make all individual seeds uniform in size in order to facilitate precision sowing with mechanical equipment. Moreover, fungicides, insecticides, hormones, fertilizers, etc., can be built into the "pill" and planted with the seed. Trials were made with two methods of pelleting onion seeds, disinfectants being incorporated in the pellets. The Michigan method employing feldspar did not give superior smut control or better stands than the less expensive New York methyl cellulose method.—University of Illinois and Cornell University.

1884. WARNE, L. G. G.

Bulb formation in the shallot.

Nature, 1948, 161: 935-6, bibl. 7.

Shallot bulbs of two sizes (medium, mean weight 10.5 g., and small, 3.12 g.) were subjected to the following treatments during the winter preceding planting: (A) ordinary (laboratory) storage; (B) low temperature (0-4° C.); (C) high (88 days at 30° C.) followed by ordinary temperature; (D) low (88 days at 0-4° C.) followed by ordinary temperature; (E) ordinary (88 days) followed by low temperature (71 days at 0-4° C.). With both sizes the mean yield (by weight) per plant of the (D) series was about double that of (A), (B) and (E), while (C) was only somewhat inferior to (D). It is suggested that treatments (C) and (D) increase the critical photoperiod for bulb initiation, as a result of which bulb initiation is delayed, bulb swelling prolonged and ripening delayed.—Manchester University.

1885. WARNE, L. G. G.

The effect of some pre-planting storage treatments on the growth of shallots.

J. roy. hort. Soc., 1948, 73: 230-4, bibl. 2.

This article is a fuller account of the experiments reported in *Nature* (see 1884), with a greater emphasis on the practical aspect that suitable high or low winter storage treatments will produce considerably higher bulb yields. Data are presented in full, from which the following figures for the mean yield (in grammes) of medium-sized bulbs per plant may be quoted: Treatment A, 82.1; B, 85.9; C, 140.8; D, 169.4; E, 73.3. The tabulated figures of the mean number of bulbs per plant show that the increase in yield is due mainly to an increase in the weight of individual bulbs.

1886. TIMS, E. C.

White rot of shallot.

Phytopathology, 1948, 38: 378-94, bibl. 32, illus.

White rot of shallot (*Sclerotium cepivorum*) has been known in Louisiana for only a few years and the infested areas at present are small. The symptoms are a wilting, yellowing and dying of leaves, with rotting of roots and basal parts. Lime applied at 1,500 lb. per acre did not give satisfactory results, but Semesan and mercuric chloride applied to the soil round growing shallots gave fairly good control.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

Early planting is perhaps the best means of control in Louisiana; if the shallots are planted early enough one good crop can be harvested before white rot develops.—Louisiana Agricultural Experiment Station.

1887. SECRETT, F. A., AND OTHERS (MINISTRY OF AGRICULTURE). 635.34
 Cabbages, brussels sprouts and miscellaneous green crops.
Bull. Minist. Agric. Lond. 132, 1946, pp. 29, illus., 1s.

General recommendations are given for the cultivation of each crop, and local practices in the main centres of production are set out in an appendix. Sprouting broccoli and kale are the miscellaneous green crops described. Varieties are tabulated for each sort of vegetable. Discussion of the control of pests and diseases includes measures against rabbits and hares.

1888. MÜLLER, P. 635.34: 632.76
Colaphellus sophiae Schall. (*Chrysomel*) als Schädling auf kultiviertem Brachland im Gebiet von Berlin. (*Colaphellus sophiae* Schall. as a pest of fallow land cultivated for the first time in the Berlin area.)

Nachr. Bl. d. Pf. Sch. Dienst, 1947, 1: 70-1.

In allotments in the Berlin area the beetle *Colaphellus sophiae* caused great damage to young cabbage and radish plants grown on dry, sandy, fallow land cultivated for the first time. Control was achieved by hand collection.

1889. THOMAS, I. 632.7: 635.34: 632.753
 Insect damage assessment.

Agriculture, Lond., 1948, 55: 125-9, bibl. 3.

A brief account is given of the methods of recording certain insect pests, of assessing damage and of forecasting seasonal development, as adopted by the committee set up by the Conference of Advisory Entomologists in 1945. Cabbage aphis and black bean aphid are among the pests discussed.

1890. SNEEP, J., AND ELZINGA, G. 635.35: 631.535
 Resultaten van een steekproef met hartloze bloemkool. (Results of a cutting trial with curdless cauliflower.)

Meded. Direct. Tuinb., 1948, 11: 393-5, illus.

Cuttings of shoots from curdless cauliflower plants produced normal curds, and it is concluded, therefore, that the disorder is not an inherited character.

1891. CAREW, J. 635.35: 632.19
 What makes cauliflowers "button"?

Marker Gr. J., 1948, 77: 6: 12, 39.

The early heading of cauliflowers in New York State may be reduced by sowing later, transplanting at 5 or 6 weeks, controlling pests and diseases and maintaining nutrient balance.

1892. VAN KOOT, Y. 635.35: 632.111
 Vorstbeschadiging bij bloemkool. (Frost damage to cauliflower.) [English summary 81.]

Tijdschr. PIZiekt., 1948, 54: 15-19, illus.

The symptoms of frost damage in cauliflowers are described. Petioles become flaccid and white. The midrib, with adjacent parenchyma, and the stem may also be injured, and the leaves distorted. The damage is most serious in light dry soils and on plants insufficiently hardened off.

1893. BIOLOGICAL BRANCH [N.S.W. DEP. OF AGRIC.]. 635.35: 632.19
 Whiptail of cauliflower.

Agric. Gaz. N.S.W., 1948, 59: 86-7.

This disease is characterized by narrow, ruffled and distorted leaves, mostly in the short season varieties of the Snowball and Nugget types. As a rule it occurs only on acid soils, and can usually be prevented by applications of lime or dolomite. Under experimental conditions an

application of sodium molybdate at the rate of 1 lb. per acre prevented whiptail.

1894. LEGGATT, C. W. 635.52: 631.531
 A contribution to the study of dormancy in seeds.
Lactuca sativa L.
Canad. J. Res., 1948, 26, Sec. C, pp. 194-217, bibl. 4.

Studies have been made of the behaviour of lettuce seeds under varied conditions of moisture, atmosphere, colour of light, and integrity of the testa. Measurements of the absolute respiration have provided curves of the drift with time of carbon dioxide output, oxygen uptake, and of respiratory quotient. Experiments with substances that might induce dormancy and light-sensitivity similar to that induced by blue light have been made. While it has not been possible to formulate a definite biochemical scheme to account for blue light effects, the experimental evidence suggests that "carbon dioxide zymasis" may be promoted by blue light and that carbon dioxide may be one of the inhibiting factors. The blue light dormant condition is characterized by depressed respiration but without more disturbance of the equilibrium of the pre- and post-glycolytic phases of respiratory metabolism than is found to be characteristic of uninhibited seeds as reported by other workers. The results of this research suggest that further elucidation of the phenomenon of dormancy should be sought in the direction of more extended studies of the respiration of dormant and non-dormant seeds. [From author's summary.]—Toronto University.

1895. WOODMAN, R. M. 635.52
 The growth and bolting of May King lettuce.
Agriculture, Lond., 1948, 55: 63-7, bibl. 19.

The object of the trial was to study the effect on bolting of date of sowing and of three watering treatments in May King lettuce plants grown in pots in an unheated glasshouse. (1) Date of sowing. The greatest average weight of leaf was obtained from September to November sowings, January and August sowings taking the second place and March to early July sowings the last. September-November sowings also resulted in the longest life in light-hours. The period of maximum bolting, irrespective of time of sowing, was May to July; it coincided with average weekly temperatures above 60° F., and with the longest days. (2) Watering treatment. A high level of water ($W_2=200$ c.c. per plant 3 times weekly) delayed bolting and encouraged hearting of January to March-sown lettuces, while a low level of water ($W_1=\frac{1}{2}$ the amount of W_2) and alternate saturation and drought ($W_2=600$ c.c. once a fortnight) had a very unfavourable effect. The W_2 treatment gave the greatest yield for any time of sowing, but water in general had no influence on length of life.—Horticultural Research Station, School of Agriculture, Cambridge.

1896. YEAGER, A. F. 635.61/62
 Breeding for earliness in vine crops [cucurbits].
Proc. Amer. Soc. hort. Sci., 1947, 50: 231-2.

A short discussion on selection for earliness in muskmelons and squashes. Mention is made of the propagation of squash plants from terminal softwood cuttings treated with hormones and rooted on a cutting bench. By this means selfed seed from field selections is easily produced in quantity under glass.—N. Hampshire Agric. Exp. Stat.

1897. MIDDLETON, J. T. 635.61: 632.8
 The occurrence of melon mosaic in southern California.
Plant Dis. Repr., 1947, 31: 385-6.

Infection by the cantaloupe mosaic virus results in the setting of fewer melons, the production of more off-shape melons, and a high percentage of sunburned fruit due to the sparsity of foliage. The pea aphid (*Illinoia pisi*) and the melon aphid (*Aphis gossypii*) are efficient vectors, while the striped and the spotted cucumber beetles (*Diabrotica trivittata* and

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

D. duodecimpunctata) are also vectors but less efficient. Field observations suggest that some control may be effected, if sulphur-resistant melon varieties are grown and sulphur applied frequently to control the aphids.

1898. ANON. 635.64
Ohio station develops new tomato variety.
Market Gr. J., 1948, 77: 6: 19.
 Ohio WR Globe is a pink glasshouse tomato variety, resistant to "the common race" of fusarium wilt. It is very like Globe, but sets fruit more readily.—Ohio Agric. Exp. Stat.

1899. HEYDECKER, W. 635.64
A labour-saving tomato.
Grower, 1948, 29: 469, illus.
 A note on the origin and characters of a new variety, Puck, bred by M. B. Crane. Apart from staking (with 9 to 12 in. stakes) this early, sturdy, bush-type tomato needs no other operation between planting and harvest. Its advantages for cloche growing are obvious.

1900. LESLEY, J. W. 635.64
Plant breeding methods and current problems in developing improved varieties of tomatoes.
Econ. Bot., 1948, 2: 100-10, bibl. 19, being *Pap. Calif. Citrus Exp. Stat. 574*.
 Theoretical considerations are discussed. "Hybrid tomato seed shows considerable promise, especially in increasing fruitfulness and earliness of maturity, and should obviate the necessity of combining all the desired characters in a single variety."

1901. DE JONGHE. 635.64: 631.523
Single cross een heterosis. (Single Cross tomato an example of heterosis.)
Cultuur Hand., 1948, 14: 169.
 The author describes the tomato variety Single Cross as a good example of heterosis (hybrid vigour). It was raised in Holland as a cross between Vetoimold and an Ailsa Craig type. It is a vigorous early variety, resistant to mould, and its fruit is of a good shape.

1902. CAMERON BROWN, C. A., AND GOLDING, E. W. 631.588.1: 635.64: 631.544
Electrical pre-warming of tomato house soil.
Tech. Rep. British Electrical and Allied Industries Res. Ass. Ref. W/T15, 1948, pp. 26, bibl. 7, illus. 18s.
 Experiments carried out in tomato houses in England and Scotland during several seasons have shown that by means of electricity soil can be warmed sufficiently for optimum planting conditions to be reached in 24 hours; this result can only be achieved by space heating at a much greater cost for several days. Details of design are discussed; the system recommended involves the use of grids of bare galvanized iron wire buried 12-15 in. in the soil and fed from transformers at about 30 volts. A specific loading of 5 watts per sq. ft. was found to be most suitable.

1903. WENT, F. W., AND CARTER, M. 635.64: 547.455
Growth response of tomato plants to applied sucrose.
Amer. J. Bot., 1948, 35: 95-106, bibl. 19.
 Sucrose was readily absorbed by tomato plants through wounds or through leaves, sprayed with or submerged in a sugar solution. Relative humidity had little effect on absorption except through wounds, when low humidity favoured it. Sugar increased the growth rate and prolonged the life of plants grown in darkness. Growth rate and flower production were increased by the application of sugar to plants growing at fairly high temperatures and low light intensities.—California Institute of Technology, Pasadena.

1904. VAN WEZER, A. 635.64: 581.162.3
Misbloci bij tomaten. (Non-setting of tomato flowers.)
Cultuur Hand., 1947, 13: 7: 12-14; 1948, 14: 1: 47-8.
 Non-setting of tomatoes under glass can be corrected by root-pruning (of plants growing too vigorously in sterilized soil), by artificial pollination, by treating the plants with a fine atomized spray, and by the use of growth substances (not specified). The last method is discussed at some length, and the advantages and disadvantages set out. The treatment is recommended for forced cultures of tomatoes, if certain precautions mentioned are taken.

1905. HITCHINS, P. E. N. 635.64: 632.19: 546.46
Curing magnesium deficiency [in tomatoes].
Fruitgrower, 1948, 105: 567.
 Magnesium deficiency symptoms may be prevented by spraying tomato plants two or three times with 2% magnesium sulphate plus 1% Estol H as spreader; 5 gal. will cover plants occupying 3,000 sq. ft. of floor space.

1906. TSUI, C. 635.64: 577.17: 546.47
The role of zinc in auxin synthesis in the tomato plant.
Amer. J. Bot., 1948, 35: 172-9, bibl. 27, being *Contr. Dep. Bot. Univ. Mich. 850*.
 Tomato plants grown in water culture solution lacking zinc were dwarfed and contained less tryptophane and auxin than normal plants. In tissue culture leaf-discs taken from such plants increased in tryptophane content three days after the addition of zinc. Leaf discs from healthy and zinc-deficient plants converted synthetic *L*-tryptophane to auxin to the same extent.—University of Wisconsin.

1907. DOOLITTLE, S. P. 635.64: 632.1/8
Tomato diseases.
Fmr's Bull. U.S. Dep. Agric. 1934, 1948, 82 pp., illus.
 Tomato diseases in the United States are described under the following heads: Importance of tomato diseases; diseases caused by bacteria and fungi; virus diseases; diseases caused by insects and nematodes; nonparasitic diseases; diseases of undetermined origin; methods of disease control; identification of tomato diseases (with a key).

1908. MACK, G. L., AND SCHROEDER, W. T. 635.64-2.95: 656.7
A comparison of aircraft dusting and ground spraying for the control of tomato diseases.
Abstr. in Phytopathology, 1948, 38: 314.
 Six alternate applications of Zerlate (zinc dimethyl dithiocarbamate) and Tribasic copper sulphate (54%) were applied to tomatoes as dusts with a Bell helicopter and with a Stearman fixed wing aircraft, and as sprays with a trailer-drawn brush-boom spray rig, at the rate of 4 lb. Zerlate or 4 lb. metallic copper per acre. Significant differences for yield and late blight control put the ground sprayer first, followed by the helicopter and aeroplane. Anthracnose control was better with the ground sprayer than with either of the aircraft.

1909. VASUDEV, R. S., AND SAM RAJ, J. 635.64: 632.8
A leaf-curl disease of tomato.
Phytopathology, 1948, 38: 364-9, bibl. 9, illus.
 A virus disease of the tomato causing dwarfing, puckering of the leaves, vein-clearing, excessive branching, and stunting of the plant, can be transmitted by grafting and by the white fly *Bemisia gossypiperda*. It is caused by the tobacco leaf-curl virus.—Indian Agricultural Research Institute, New Delhi, India.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

1910. CHAMBERLAIN, E. E. 635.64: 632.8
 Tomato streak.
Bull. N.Z. Dep. Agric., 281, 1947, pp. 11, bibl. 3.
 Tomato streak, stripe, or black stripe is described under symptoms (longitudinal streaks on stems and leaf mosaic), incidence and economic importance, characteristics of the virus, factors favouring development, host range (tobacco, cape gooseberry, chilli pepper, eggplant, black nightshade), seed transmission, and control. The control measures recommended include: soil disinfection, obtaining seed from healthy plants only, isolation from other hosts, removal and destruction of infected plants as soon as they are noticed, and disinfection of hands after handling diseased plants. Workers handling tomato plants should refrain from smoking, or smoke sterilized tobacco only.

1911. ANON. 635.64: 632.8
 Big bud (rosette) of tomatoes and other plants.
Agric. Gaz. N.S.W., 1948, 59: 139-43.
 Big bud of tomatoes, a virus disease, is transmitted by the leaf-hopper or jassid, *Thamnotettix argentata*, in Australia, though other jassids are vectors in other countries. It has been reported from all tomato growing areas in New South Wales, but it is seldom important in the coastal belt. The most characteristic symptom is the enlargement of the flower buds. The flowering stalks mostly remain erect, the sepals often fail to separate, and the flowers, which open only partially, are green. The virus attacks many species of plants—weeds, ornamentals, fodder plants and vegetables. Control measures suggested are the destruction of weeds in the vicinity of tomatoes and the application of DDT preparations to kill the vector.

1912. WALKER, J. C., AND KENDRICK, J. B., Jr. 635.64: 632.3: 631.8
 Plant nutrition in relation to disease development.
 IV. Bacterial canker of tomato.*
Amer. J. Bot., 1948, 35: 186-92, bibl. 8.
 Tomato plants in sand culture were inoculated with bacterial canker, *Corynebacterium michiganense*. Wilting increased as the nutrient concentration was increased, but the formation of cankers decreased. Changes in the level of N, P or K in an otherwise balanced solution were without effect on the development of wilt, which was least rapid at pH 6.5. Wilt development decreased with the age of the tomatoes at inoculation. The differences in the behaviour of bacterial canker and fusarium wilt are discussed.—University of Wisconsin.

1913. FULTON, J. P. 635.64: 632.4
 Infection of tomato fruits by *Colletotrichum phomoides*.
Phytopathology, 1948, 38: 235-46, bibl. 18.
 Unwounded tomato fruits are susceptible to infection from the time they are 10 days old until maturity. Susceptibility increases with the age of the fruit. The fungus remains latent in green fruits until they ripen, when typical lesions appear. Detached, mature, unwounded fruits are readily infected through a wide range of temperature below 90° F. Lesions developed most rapidly at 80° F.—University of Illinois.

1914. KENDRICK, J. B., Jr., AND WALKER, J. C. 635.64: 632.4
 Anthracnose of tomato.
Phytopathology, 1948, 38: 247-60, bibl. 17.
 A cultural and physiological study of *Colletotrichum phomoides* (see preceding abstract). The fungus is important only on ripening tomato fruit, but under favourable conditions it will infect the foliage, stem and root, on which it causes very slight symptoms and little damage. It can apparently be transmitted with seeds from infected fruits.—University of Wisconsin.

1915. CHURCH, H. 635.64: 632.4
 Drastic measures pay best dividends.
Grower, 1948, 29: 736-7.
 A grower's account of measures to control an outbreak of stem rot in tomatoes, caused by *Didymella lycopersici*, in a commercial glasshouse in Essex. Careful sanitation and judicious ventilation allowed him to harvest 53 tons per acre, although 9% of the plants were lost.

1916. CRANDALL, B. S. 635.64: 632.4
Cladosporium leaf mold of tomatoes in the Peruvian Montana.
Plant Dis. Repr., 1947, 31: 358-65.
 Leaf mould is an important factor in tomato growing throughout the Latin American tropics. The use of resistant varieties, developed originally for use in greenhouses, seems to furnish a quickly available means for combating the disease. Selections have been made and trials carried out with promising varieties. Certain selections are being distributed for small-scale trials in various regions of Peru.

1917. LANGFORD, A. N. 635.64: 632.4
 Autogenous necrosis in tomatoes immune from *Cladosporium fulvum* Cooke.
Canad. J. Res., 1948, 26, Sec. C, pp. 35-64, bibl. 20.
 Tomato plants immune to *Cladosporium fulvum* physiological races 1 to 4 by virtue of their descent from *Lycopersicon pimpinellifolium*, may develop a serious leaf necrosis, if they are homozygous for the factor *ne* found in *L. esculentum*; they remain healthy if the dominant allele *Ne*, from *L. pimpinellifolium* is present. Plants susceptible to *C. fulvum* never become necrotic. Tomato breeding is discussed in the light of this complication.

1918. LEBEDEV, D. V. 635.64: 632.48
 Immunity in plants and antibiotics. [Russian.]
Priroda (Nature), 1948, No. 1, p. 66, bibl. 8.
 This short article reviews the relation between immunity in plants and antibiotic activity, with particular reference to work in America on tomatoes and the wilt-inducing fungus, *Fusarium oxysporum* f. *lycopersici*, and the antibiotic substance lycopersicin or tomatin.

1919. MICHELBAKER, A. E., MIDDLEKAUFF, W. W., AND AKESSON, N. B. 635.64: 632.78
 Controlling common pests of tomato in northern California.
Circ. Calif. agric. Exp. Stat. 384, 1948, 15 pp., illus.
 The chief pests of the tomato, with natural size illustrations of their caterpillars, are described in simple terms, with notes on control. They are: tomato pinworm, potato tuber moth larva, alfalfa looper, beet armyworm, yellow-striped armyworm, corn earworm, tomato hornworm, and tobacco hornworm. The tomato mite is also mentioned.

1920. COMMON, I. F. B. 635.64: 632.78
 Control of corn ear worm on tomatoes.
Qd agric. J., 1948, 66: 102-4.
 To control the corn ear worm, *Heliothis armigera*, mites and various fungi, tomatoes should be sprayed fortnightly with a mixture of DDT, sulphur and copper oxychloride.

1921. DUNN, E. 635.64: 632.77
Delia cilicrura Rond. (*Dipt., Anthomyiidae*) attacking tomato plants in Jersey.
Ent. mon. Mag., 1948, 84: 57.
 Larvae of *Delia cilicrura* damaged tomato stems, which decayed at soil-level; the plants wilted and died.—States Experimental Station, Jersey, C.I.

* For Part III, see *ibid.*, 1946, 33: 259-64; *H.A.*, 16: 2124.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

1922. DE WAARD, J., AND ROODENBURG, J. W. M. 631.547.4: 635.64
 Premature flower-bud initiation in tomato-seedlings caused by 2,3,5-triiodobenzoic acid.
Proc. Kon. Nederl. Akad. Wetensch., 1948, 51: 248-51, bibl. 4, illus.
 Tomato seedlings were sprayed with triiodobenzoic acid as soon as the cotyledons had expanded; the development of three leaf initials, already perceptible, was retarded and the growing point began to differentiate flower buds a month later. This experiment upsets the idea that flowering is only possible after a juvenile phase, during which the seedling must form a certain minimum number of leaves (8 for the tomato).—Utrecht University and Division of Horticultural Research, Ministry of Agriculture.

1923. KLEMM, M. 635.64: 632.9
 Versuche über die Wirkung des Verwitterungsmittels "Kornitol" auf den Geschmack der Tomatenfrüchte. (The effect of the anti-rodent preparation "Kornitol" on the taste of tomatoes.)
Nachr. Bl. dtsch. Pfl. Sch. Dienst, 1947, 1: 144.
 "Kornitol" is one of the German preparations officially recommended for rabbit control in vegetable gardens. Sacking saturated in a "Kornitol" solution and tied round tomato stakes without touching the plants was found to affect the taste of the fruits. An adverse effect on other crops has so far not been reported.

1924. SAINT-SMITH, J. H. 635.64: 658.8
 Marketing Queensland tomatoes in Sydney.
Qd agric. J., 1948, 66: 88-92.
 Practical measures to avoid rejection of Queensland tomatoes inspected in Sydney include the use of suitable varieties and adherence to the grading regulations.

1925. RICE, E. R. 635.65: 577.17
 Absorption and translocation of ammonium 2,4-dichlorophenoxyacetate by bean plants.
Bot. Gaz., 1948, 109: 301-14, bibl. 16, being *Contr. Hull Bot. Lab.* 597.
 The test plants were young red kidney beans. The growth substance was applied in aqueous solution, with or without 0.5% Carbowax 1500. Experiments were made in three temperature ranges, and in light intensities of 100 and 900 ft. candles and in the dark. Much of the absorption of the growth substances occurred in the first 4 hours, but the addition of Carbowax led to continued absorption during 72 hours. The amount absorbed increased with temperature; it was greater in the dark than in light. No translocation from the treated leaf occurred in the dark; translocation appeared to increase with light intensity. It was unaffected by the addition of Carbowax; the effect of temperature was inconclusive.

1926. BRUNSTETTER, B. C., AND OTHERS. 635.65: 577.17: 581.192
 Mineral composition of bean stems treated with 3-indoleacetic acid.
Bot. Gaz., 1948, 109: 268-76, bibl. 13.
 Changes in the Ca, Mg, K, P, Mn, Cu, Fe, Al and B content of bean stems were followed for six days after treatment by means of spectrochemical analysis.

1927. STODDARD, E. M. 635.65: 632.3
 Susceptibility to common blight of bean as influenced by level of nutrition.
 Abstr. in *Phytopathology*, 1948, 38: 315.
 The effect of the nutrition level on the susceptibility of Red Kidney bean to common blight (*Xanthomonas phaseoli*) was studied on plants grown in sand at nutrient levels of 1, 10 and 100. The percentages of plants showing wilting of the foliage 13 days after inoculation in the ascending order of nutrient levels were 91, 88, and 21.

1928. FOSTER, H. H. 635.65: 632.4
 Reaction to rust, under Mississippi conditions, of certain lines and varieties of pole snap beans.
Plant Dis. Repr., 1947, 31: 378-83.
 Bean rust (*Uromyces appendiculatus*) reduces the yield and frequently the quality of garden pole snap beans, and there is a definite need for a rust-resistant variety of high commercial quality for Mississippi conditions. Trials recorded show that none of the commercial varieties tested is highly resistant, while Kentucky Wonder and Ideal Market are extremely susceptible.

1929. MACHACEK, J. E., AND BROWN, A. M. 635.65: 631.531.17
 Experiments on vegetable seed disinfection and observations on varietal resistance of beans, peas and sweet corn to some diseases in Manitoba.
Sci. Agric., 1948, 28: 145-53, bibl. 19, being *Contr. Div. Bot. Pl. Path. Sci. Serv. Dep. Agric. Canada* 925.
 Treatment of pea seed with various seed disinfectants gave variable results. In some years treatment increased both germination and yield, while in others it did not. Occasionally, even a substantial improvement in germination was not followed by an improvement in yield. New Improved Ceresan or Half-ounce Leytosan, diluted to three times the original volume with talc, was found to be safe for application in excess to a wide variety of vegetable seeds. There appeared to be no need for an exact measurement of the quantity of diluted dust to be applied to a given amount of seed. Treated seed of cucurbits, peas, beets, spinach, and peppers showed greatly improved germination over untreated seed when sown in unsterilized soil. The benefit to other kinds of seed was less, while with celery and parsnip there apparently was none at all. [From authors' summary.]

1930. YU, T. F., AND FANG, C. T. 635.651: 632.48
 Fusarium diseases of broad bean. II. Further studies of broad bean wilt caused by *Fusarium avenaceum* var. *fabae*.
Phytopathology, 1948, 38: 331-42, bibl. 29, being *Pap. 33, Div. Pl. Path. Inst. agric. Res. Nat. Tsing Hua Univ. China*.
 A continuation of work previously noted (H.A., 14: 1795). It records results of environmental factors in relation to the development of the disease. Dry and medium-moist soils were better for the development of the disease than wet and saturated soils. The largest number of wilted plants occurred in soils of pH 6.25 to 6.67. Poor soils were more favourable than richer soils for the development of the disease. The fungus was found on seed-coats, possibly by contamination at threshing time.—National Tsing Hua University, Peiping, China.

1931. DE FLUTTER, H. J., AND ANKERSMIT, G. W. 635.65: 632.753
 Gegevens betreffende de aantasting van bonen door de zwarte bonenluis (*Aphis (Doralis) fabae Scop.*). (The infection of beans by the black bean-aphis.) [English summary 1½ pp.]
Tijdschr. Pl. Ziekte, 1948, 54: 1-13, bibl. 10.
 In the experiments described it was found that many aphids were caught in the hooked hairs on the under surface of French bean leaves (*Phaseolus vulgaris* L.), and some of the trapped insects died soon afterwards. The aphid's predators were also hindered, though mature coccinellids were apparently not affected by the hairs. Notwithstanding the high mortality among the aphids trapped by the hooked hairs, the aphid population may continue to increase, the predators being too much hindered in controlling the pest.

1932. HOWARD, N. F., BRANNON, L. W., AND MASON, H. C. 632.76: 635.65
 The Mexican bean beetle in the east and its control.
Fmr. Bull. U.S. Dep. Agric. 1624, 1948, 18 pp.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

The Mexican bean beetle, *Epilachna varivestis* Muls., is the most serious pest of all kinds of edible beans in those parts of the United States which it inhabits. For its control sprays or dusts containing rotenone are most satisfactory.

1933. BURCHFIELD, H. P., AND MCNEW, G. L. 635.1/7: 631.531

Quantitative determination of tetrachloro-p-benzoquinone on treated seed.

Phytopathology, 1948, 38: 299-306, bibl. 14.

A simple colorimetric method of analysing treated seed for tetrachloro-para-benzoquinone has proved reliable on pea, corn, lima bean, spinach and beet seed.

1934. LEGGATT, C. W. 635.656: 632.19: 546.27
Germination of boron-deficient peas.

Sci. Agric., 1948, 28: 131-9, bibl. 6.

It is suggested that the dusting of pea seeds with borax may be sufficient to enable the plants to develop normally in soils deficient in boron. Seeds from plants grown in soil deficient in boron germinated abnormally unless borax was added to the medium.

1935. REYNOLDS, J. D., AND NORTH, C. 635.656
Rogue seed in Harrison's Glory peas.

Agriculture, Lond., 1948, 55: 110-13, bibl. 2.

Harrison's Glory, which has a green, large and dimpled seed, is the most widely grown drying pea in Britain. Since atypical seed usually turns black on cooking, the production of a uniform sample is most desirable. The most general cause of untrue samples of Harrison's Glory peas is inferior stock containing a high proportion of rogues, of which there are 3 principal types (all illustrated): Tall rogues, coloured flowered rogues, and tare-leaved rogues. "Tall" and "tare-leaved" breed true, while "coloured flowered" is a recessive character. "Tall" and "coloured flowered" plants can be easily rogued in the field, whereas "tare-leaved" are less conspicuous. The crop should be grown from selected stock seed, and should be examined once or twice during the growing season for rogues.

1936. GOOSSENS, J. 635.656: 632.48

Een voor ons land nieuwe vaatziekte der erwten. ("The American Wilt" of peas, a new disease for the Netherlands.) [English summary † p.]

Tijdschr. PlZiekt., 1948, 54: 75-80, illus.

A serious disease of field peas (for drying) in Holland kills plants before they flower. It is caused by *Fusarium orthoceras* var. *pisi*. Field trials showed that 5 varieties and a selected type of "dry field peas" were very susceptible, while Schokker and Capucijner types were very resistant.

1937. WRIGHT, D. W., AND GEERING, Q. A. 635.656: 632.78

The biology and control of the pea moth, *Laspeyresia nigricana*, Steph.

Bull. ent. Res., 1948, 39: 57-84, bibl. 14, illus.

Three hymenopterous parasites were so abundant that breeding them could have but little effect on the pea moth population. Various cultural methods are suggested to reduce pea moth damage. Chemical control.—Peas that are to be picked green should be sprayed with DDT (½% emulsion, 140 gal. per acre) 7 to 10 days after they begin to flower. A second spray should be applied 14 days later, if the crop is to be harvested dry. The experiments were carried out in Essex and at the Horticultural Research Station, Cambridge.

1938. LARDY, H. A. 632.951: 635.656: 635.67
Experiments with peas and sweet corn treated with DDT insecticides.

Industr. Engng Chem., 1948, 40: 710-11, bibl. 2.

No DDT was found in shelled or canned peas from plants dustered with this insecticide. Very small amounts occurred

in the fat or milk of cattle fed silage of pea vines or corn that had been dusted; the risk to human health from this source appears to be negligible.—University of Wisconsin.

1939. ÅBERG, E., HAGSAND, E., AND VÄÄRTNÖU, H. 577.17: 632.954: 635.65

Hormonderivat i kampan mot ogräs. V. Fältförsök 1946-1947. (Hormone derivatives for weed control. V. Field trials 1946-1947.)

[English summary 2 pp.]
Publ. Inst. Plant Husb. (Crop Prod.) roy. agric. Coll. Sweden 3, 1948, pp. 8-64, bibl. 50.

An account is given of field studies into the effects of hormone derivatives on the development of (1) weeds and weed seeds and (2) certain cultivated crops, including peas and beans. The effect of hormone derivatives on numerous weed species is discussed and summarized. In those weeds not killed by the treatment the seed set was very variable. In some weeds treated the seed produced was very small; in other cases germination of the seed was inhibited in varying degrees. Very low amounts of the derivatives appeared to stimulate the growth of cultivated plants. Leguminous crops are very sensitive, and in practice only peas can be sprayed. [The tabulated data indicate that the concentration of Wormosan C and Agrozone tolerated is insufficient for effective weed control.] Applications of nitrogen to sensitive crops in order to reduce the undesirable effect of hormone derivatives was ineffective.

1940. MANNS, T. F. 635.8: 632.4
The vert-de-gris disease of the cultivated mushroom occurring in the United States.

Plant Dis. Rept., 1947, 21: 417-18.

A disease of mushrooms in Pennsylvania, Maryland, Ohio and Illinois appears to be identical with one described in France in 1894, and is attributed to *Myceliophthora lutea* Cost. It is primarily an infestation of the casing soil and not of the compost, and such soil should never be used in supplementing composts, as the "top heat" of 140° F. in the bed does not completely control the disease in the compost.

Potatoes.

(See also 2056c, e, g, h, j-m, o, q, r, u, x-z, 2057b, c, f, g, 2303, 2324, 2327, 2333.)

1941. HARDENBURG, E. V. 633.491(7)
Current potato research in North America.
Amer. Potato J., 1948, 25: 183-90, being *Pap. Dep. Veg. Crops, Cornell Univ.* 295.

In October, 1947, the American states, Canadian provinces and some other bodies were invited by the Committee on Research of the Potato Association of America to specify their current potato research projects. The article presents a list of these projects and their location, under the following heads: breeding, cultivation, diseases and control, fertilizer, harvesting, hormone treatment, insects and control, irrigation, marketing, planting, quality, seed, soil management, storage, varieties, vine killers, weed killers. The compilation shows that disease and pest control, the breeding and testing of new varieties and manuring are the problems chiefly studied.

1942. MCINTOSH, T. P. 633.491
Scottish seed potatoes: A survey of the position.
Scot. Agric., 1948, 28: 35-42.

The delivery of Scottish seed potatoes to England and Wales increased from about 150,000 tons yearly before the war to over 473,000 tons in 1943/44, being about 385,000 tons in 1945/46 and 1946/47. The Director of the Seed Testing, Plant Registration and Plant Pathology Station gives a survey of the position under the following, among other chief headings: (1) Adverse factors. (2) Building up stock seed and virus-tested stocks. (3) Origin of stocks. (4) Other methods of combating virus diseases. (5) Combating

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

other diseases. (6) Handling of potatoes. (7) Export trade. (8) Research and investigation.

1943. BEVERLY, V. C., LIBBY, W. C., AND WYMAN, O. L. 633.491(741)
Producing potatoes in Maine.
Me Ext. Bull. 341, 1946, pp. 40, bibl. 18, illus.
(Received 1948).

A well-illustrated farmers' bulletin, in simple question and answer form, which sets out to answer all questions likely to be asked about the growing, harvesting and marketing of potatoes and the buying and equipping of potato farms in Maine.

1944. NISSEN, Ø. 635.1: 631.16
Sammenligning av dyrkingsomkostninger og avling av forskjellige rotvekstarter, plantet og sådd. (A comparison of production costs and yields in different root crops grown from seed and otherwise.) [English summary 6½ pp.]

Meld. Norges Landbr. Høgsk., 1947, 27: 165-236, bibl. 5, being *Meld. Åkervekstforsk. Norges Landbr. Høgsk.* 133.

The experiments had as object to determine which of the root crops, including potatoes, will give the best economic results under a variety of conditions obtaining on Norwegian farms.

1945. MILLER, J. C. 633.491-1.523
Three new varieties of Irish potatoes.
Amer. Potato J., 1948, 25: 89-91.

Notes on characters of 3 seedlings which show promise under Southern—short day conditions, namely DeSota, LaSoda and LaSalle.

1946. WHEELER, E. J. 633.491
The testing of varieties as it applies to a potato improvement program.

Abstr. in *Amer. Potato J.*, 1948, 25: 62.
Soaking a plug from a tuber in 95% ethyl alcohol gives a test similar to boiling. A specific gravity test may be carried out on the same tuber and still leave some of it for planting.

1947. KUNKEL, R., SHALL, L. A., AND BINKLEY, A. M. 633.491-1.8
The relationship between maturity, yield, color and cooking quality of Bliss Triumph potatoes.
Abstr. in *Amer. Potato J.*, 1948, 25: 53.

Yield continued to increase as long as the vines were alive. Tuber colour faded from early harvest to an almost constant level; it was best in tubers harvested while the tops were still green. Specific gravity of tubers increased initially but later decreased as the season became hotter and the vines began to die.

1948. SCHNELL, L. O. 633.491-2.411
A study of meiosis in the microsporocytes of interspecific hybrids of *Solanum demissum* × *Solanum tuberosum* carried through four back-crosses.
J. agric. Res., 1948, 76: 185-212, bibl. 20.

A study of meiotic abnormalities in potato hybrids. It is concluded that breeding for blight resistance in commercial varieties of *Solanum tuberosum* by the use of *S. demissum* × *S. tuberosum* crosses must remain primarily a trial and error method.

1949. HANSEN, F. 631.8: 633.491
Gødningsforsøg paa Forsøgsstationen ved Studsgaard 1937-44. (Manuring trials at the Studsgaard research station 1937-44.)
Tidsskr. Planteavl., 1947 (?), 51: 500-27, being Beretn. St. Forsøgvirks. Plantekult. 408.

In the manurial trials, carried out on the very light sand soil of Studsgaard research station, potatoes are included in the 4-year rotation. One application of stable manure (=36 tons +12 tons liquid manure per hectare for 4 years) has been introduced as a standard measure and this is compared with an equal amount of nutrients applied as artificial

fertilizers. With potatoes, for the period 1929-44, ½ and 1 application of artificial fertilizers produced higher yields (31·8 and 43·3 quintals per hectare) than ½ or 1 application of stable manure respectively (28·4 and 44·3), while 1½ stable manure proved much superior (52·0 quintals per hectare) to 1½ artificials (46·0). The artificial were made up of 1,500 kg. of a nitrate fertilizer or 1,200 kg. ammonium sulphate, 750 kg. superphosphate, and 750 kg. of a 40% potassium salt. In another trial stable manure by itself was compared with stable manure plus additions of artificial fertilizer. Potato yields from stable manure plots were 67·0 quintals per hectare. All the additions resulted in increased yields, that from the addition of ½ nitrate + superphosphate, namely 8·5 quintals, being the largest.

1950. HILL, H., AND CANNON, H. B. 633.491-1.8
Nutritional studies by means of tissue tests with potatoes grown on a muck soil.
Sci. Agric., 1948, 28: 185-99, bibl. 10, being Contr. Div. Hort. Exp. Fms Serv. Ottawa 680.

The tissues chosen for rapid analysis were the lower petioles of potatoes; these were grown in a factorial experiment involving three levels of N, P and K, and the results for three years are discussed. Yields were depressed when K was less than 3,500 to 4,000 p.p.m. When K was less than 3,000 p.p.m., yield decreased as P increased above 70 p.p.m. There was a negative correlation between yield and N, when this was from 200 to 1,000 p.p.m., but below 200 p.p.m. this relation was apparently reversed. The interactions, and the negative relationship between K and Mg and Ca, are discussed.

1951. BERGER, K. C. 633.491-1.8
Soil fertility investigations with potatoes in Wisconsin.
Abstr. in *Amer. Potato J.*, 1948, 25: 47-8.

Unbalanced manuring has brought about a rise in soil acidity to pH 4·5 with consequent unavailability of nutrients. Manuring trials have shown that potato yields can be increased by as much as 140% by applying 1,200 lb. per acre of 6-6-18 fertilizer, broadcast, plus 800 lb. per acre of 3-12-12 at the side of the seed in the row.

1952. BAKER, L. C., PARKINSON, T. L., AND KNIGHT, P. M. 633.491: 577.16
The vitamin-C content of potatoes grown on reclaimed land. II. Potatoes grown in 1946.*
J. Soc. chem. Ind. Lond., 1948, 67: 118-20, bibl. 2.

Potatoes from 13 different varieties grown on reclaimed fenland were assayed and certain significant varietal differences were found. From these and previous figures a rough classification of some potato varieties according to their vitamin-C contents has been attempted. Application of varying manurial treatments to potatoes of the same variety did not appear to have any significant influence on vitamin-C content. The average concentrations of vitamin C in 9 of the 13 varieties examined in November-December (i.e. omitting the two highest and two lowest varieties) fell within the range $0\cdot14 \pm 0\cdot03$ mg./g. In general, the concentration of dehydroascorbic acid found in potatoes of the 1946 crop was normal; this suggests that the high values obtained for potatoes of the 1945 crop were caused by some seasonal effect. [From authors' summary.] —Lyons' Laboratories, London.

1953. DROUINEAU, G., GOUNY, P., AND LEFÈVRE, G. 633.491-1.8
Influence des fumures organiques en sol calcaire sur le rendement et la nutrition minérale de la pomme de terre de primeur. (The effect of organic manures in calcareous soils on the yield and mineral nutrition of early potatoes.)
C.R. Acad. Agric. Fr., 1948, 34: 273-5.

* For I, see *ibid.*, 1946, 65: 428-30; *H.A.*, 17: 1055.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

Early potatoes, grown on calcareous soils in the Mediterranean climate respond readily to organic manures. Plots receiving dung yielded 32% more than plots receiving mineral fertilizers only, and the leaves had a higher potassium content.

1954. KOBLET, R. 633.491-1.84

Untersuchungen über den Einfluss der Stickstoffdüngung auf den Krankheitsbefall und die Speisequalität der Kartoffel. I. (The influence of nitrogen manuring on disease incidence and eating quality in potatoes. I.) [French summary 1½ pp.]

Landw. Jb. Schweiz, 1947, 61: 665-99, bibl. 47.

Thirty manurial experiments were carried out in central Switzerland during the period 1943-1946 in order to study the effect on the potato of increasing dosages of nitrate nitrogen applied in addition to stable manure, superphosphate and potassium phosphate. Disease incidence and eating quality were examined at the beginning and the end of the storage period. High nitrogen applications (60-90 kg. nitrate nitrogen per hectare) were found to increase the susceptibility of the foliage to *Phytophthora* infection—as a result of its more luxuriant growth—and, in certain varieties, the susceptibility of the tuber both to "blackening after cooking" and to the effects of rough handling. Other diseases and eating quality remained unaffected by the amount of nitrogen applied. Increased susceptibility to rough handling became manifest in the high incidence of blackening after cooking.—Swiss agricultural experiment station, Zürich-Oerlikon.

1955. VOLKART, A. 633.491-1.84

Der Einfluss steigender Stickstoffgaben auf den Saatgutwert der Kartoffeln. (The influence of increasing nitrogen applications on the quality of seed potatoes.) [French summary 8 ll.]

Landw. Jb. Schweiz, 1948, 62: 83-95.

Forty-eight trials, carried out in different localities in Switzerland, showed that the application of nitrogen in addition to stable manure had no significant effect on the quality of seed potatoes.

1956. TANDON, S. L. 633.491-1.84

Effect of nitrogenous fertilizers on the respiration rate of potato tubers.

Curr. Sci., 1948, 17: 124, bibl. 4.

Figures are given showing that more CO₂ was evolved by tubers from manured land (40 and 80 lb. N per acre) than from the controls. Tubers from the manured plots had poorer keeping qualities.—Univ. of Delhi.

1957. ATKINSON, H. J., PATRY, L. M., AND LEVICK, R. 633.491-1.8

Plant tissue testing.* III. Effect of fertilizer applications.

Sci. Agric., 1948, 28: 223-8, being *Sci. Contr. Div. Chem., Sci. Serv., Canada* 150.

During three seasons tissue tests for N, P and K were made on tomatoes, potatoes and corn grown in a fertilizer trial. Concentrations of N and K in the plants were increased by the appropriate fertilizer; both declined during the season. Yields were generally related to tissue tests for N; but in some cases where NPK nutrition was adequate yields were limited by other factors.

1958. DORPH-PETERSEN, K. 631.82: 633.491

Forsøg med stigende Maengder Kalk og Mergel. (Trials with increasing applications of lime and marl.)

Tidsskr. Planteavl, 1947 (?), 51: 1-113, bibl. 19, being *Beretn. St. Forsøgsvirks. Plantekult.* 400.

Primarily, the paper deals with crops with which this

* For Part I, see *ibid.*, 1944, 24: 437-42, *Contr. 107; H.A.*, 14: 1671.

Bureau is not concerned. Potatoes were found to thrive best at the following pH values: good loam soil, 7.0-7.5; light loam soil, 6.0-7.0; sand soil, 6.0-6.5; sand, 5.5. An increase of scab was found to be associated with higher applications of lime to potatoes. Manganese and boron deficiency diseases connected with liming are also discussed.

1959. WIEBOSCH, W. A. 633.491-2.19: 546.711

Bespruitingsproef met mangaansulfaat op aardappelen in 1947. (A spraying trial with manganese sulphate on potatoes in 1947.)

Meded. Direct. Tuinb., 1948, 11: 396-9.

Potatoes showing symptoms of manganese deficiency gave good response to spraying twice with 1% manganese sulphate solution.

1960. SUTULOV, A. N. 633.491: 581.192

A new property of potato fat. [Russian.]
Priroda (Nature), 1948, No. 2, p. 56.

A short review of a paper by W. Kröner and W. Völksen (*Naturwiss.*, 1942, 30: 473) in which they announce that they have obtained linolic and linolenic acids from potato fat. The significance of this is that some workers associate these acids with vitamin F, while their effect on the biological activity of pyridoxine (vitamin B₆) is generally recognized. The results thus emphasize the nutritional value of potatoes.

1961. NÈGRE, —. 633.491-1.55

Intérêt de l'arrachage précoce des pommes de terre. (The advantages of lifting immature potatoes.)

Prog. agric. vitic., 1948, 129: 307-10.

The experimental results tabulated show that the tubers lifted early (end of August) produced fewer virus-infected plants than those lifted later. They were also less liable to blight.—Dept. de l'Aveyron.

1962. D'AGUILAR, J., AND QUEMERE, F. 633.491-1.55

L'arrachage précoce. (Early harvesting [of potatoes].)

Pomme de Terre fr., 1948, 9: 5: 22-3.

In soil infested with click beetle larvae, damage to potato tubers can be reduced by early harvesting; care must be exercised, as the tubers are not then mature.

1963. FURLONG, C. R. 664.84.21

Summer potato storage in clamp and cool store.
Agriculture, Lond., 1948, 55: 81-5.

The observations on the clamp showed that at the end of April the average temperature inside the clamp was about 2.7° F. higher than that of the outside air. In May the temperature began to rise more rapidly than the air temperature, so that in early August, when the average temperature of the clamp had reached a maximum of about 80° F., the difference was 18° F. Heavy sprouting had occurred by the end of May; the tubers were wilted and the flavour was deteriorating. By the end of June wilting and sprouting were so advanced that the potatoes were almost useless. In contrast with the clamped potatoes, those in store at 40-42° F. were still in very good condition at the end of June. At the end of August the texture and flavour were still fairly good. There was slight sweetening, but sprouting was not serious. Storage at 45° F. in air containing a low concentration of ethylene (1 part in 10,000) almost completely inhibited sprouting. The treatment had no adverse effect on quality. Loss in weight of the potatoes after 120 days' storage was about 9% in the stores in which air was circulated continuously; in a store which was fully loaded, and in which air circulation was intermittent, the loss was only about 3% for approximately the same period of storage. The bruising and marking of potatoes in the bottom sacks was not very serious, even when the stacks were 12 sacks high. [Author's summary.]—Ditton Laboratory, East Malling, Kent.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

1964. WERNER, H. O. 664.84.21
 Storage and shipping tests with Nebraska Triumph seed potatoes for southern midwinter planting.
 Abstr. in *Amer. Potato J.*, 1948, 25: 60.
 The heating of potatoes in storage and in transit is described.

1965. WERNER, H. O. 664.84.21
 Some experiences with shell cooled bins for storing seed potatoes.
 Abstr. in *Amer. Potato J.*, 1948, 25: 60.
 A description is given of air-cooled bins, subdivided into sections 4 feet wide, with circulating air spaces in partitions. Air is circulated continually and cold air introduced intermittently. Potato tubers thus stored in early October were kept dormant until the middle of May and even the beginning of June.

1966. ANON. 633.491: 631.36: 631.588.1
 Let electricity handle your potatoes.
Me Ext. circ. 240, 1947.
 A folder illustrating several electrically-driven potato-bin loaders, and unloaders, most of them home-made.

1967. (MOMMELÉ, G.) 633.491-1.532.2-1.563
 Une belle réalisation de silo-germoir. (A combined store and germinator [for potatoes].)
Pomme de Terre fr., 1948, 9: 5: 10-13.
 The germinator can sprout 180 to 270 tons of potatoes; it is well lit and can be warmed artificially. Underneath is the main store, holding 960 tons. The whole structure is thoroughly insulated.

1968. FELTON, M. W. 664.84.21
 The development of stem end discoloration in Bliss Triumph potatoes held in warm storage.
 Abstr. in *Amer. Potato J.*, 1948, 25: 49-50.
 The percentage of tubers showing stem end discoloration as a result of *Fusarium* infection increases at storage temperatures above 40-45° F.

1969. ANDRÉN, F. 664.84.21: 632.411
 Iagningsförsök med potatis från besprutade odlingar. (A storage trial with potatoes from sprayed fields.)
Växtskyddsnötiser, 1947, No. 2, pp. 21-4.
 Two storage tests showed that a close relationship exists between blight control in potato tops and blight incidence in the tubers ($r=0.821$ and $r=0.931$). When 2% bordeaux mixture was compared with commercial copper preparations, used at the strength recommended by the manufacturers, bordeaux spray proved superior; but when the copper content of the proprietary solutions was increased to that of 2% bordeaux, the difference was less significant. The percentage of blighted tops and tubers following spraying with 2% bordeaux and 9 other copper preparations is tabulated. See also *ibid.*, 1946, No. 5, pp. 73-8; *H.A.*, 17: 1454.

1970. ORMAN, A. C. 664.84.21
 Prevention of sprouting in potatoes. Investigation in New South Wales.
Agric. Gaz. N.S.W., 1948, 59: 128-9, 164.
 An account of experiments carried out by the Department of Agriculture, N.S.W., using methyl ester of *a*-naphthalene-acetic acid and Barsprout, a proprietary sprout inhibitor. Although the treatments did not completely prevent sprouting—this may have been a result of uneven dusting—it was considerably retarded and the quality of the tubers had not appreciably deteriorated.

1971. PETERSSON, G., AND FREDRIKSSON, L. 633.491-1.532.2
 Patatsutsädets klyvning. (The cutting of seed potatoes.)
Forsök o. Forskning, 1947, 4: 49-50, reprint from *Särtryckser. Jordbruksförsöksanst.*, *Lantbruks högskol.* 20.
 The yields from halved 100 g. seed potatoes of 6 varieties were found to be 4-17% lower than those from whole 50 g. tubers. A second trial with one variety in the following year showed that, if cutting is necessary, it should be carried out 3-6 days prior to planting to allow for callus formation on the wounds.

1972. DYKSTRA, T. P. 633.491: 631.521.3
 Production of disease-free seed potatoes.
Circ. U.S. Dep. Agric. 764, 1948, pp. 64, illus.
 The general methods of producing clean potato "seed" are described in some detail. A comprehensive key to 29 potato diseases is followed by an account of each.

1973. PASCHAL, J. L., LANE, G. H., AND KREUTZER, W. A. 633.491-2.3
 The double-edged stationary potato cutting knife for saving labor, reducing the spread of ring-rot, and reducing equipment costs.
Bull. Colo agric. Exp. Stat. 493, 1946, pp. 11, illus. [received 1948].
 The apparatus illustrated shows a fixed, vertical, 2-edged knife, to the top of which corrosive sublimate solution is led by rubber tubing from a 4-gallon reservoir above, the waste being conducted to a container below. For control of ring-rot a constant flow of mercuric chloride must be maintained over both sides of the knife. The potato is taken from the bin and alternately pulled and pushed against one or other of the two edges of the knife until seed pieces of a suitable size have been cut.

1974. DYKSTRA, T. P. 633.491-2.3/4+2.8
 Potato diseases and their control.
Fmrs' Bull. U.S. Dep. Agric. 1881, 1948, 53 pp., illus.
 This bulletin discusses the disease problems of growers of potato table stock under such headings as general control measures, spraying and dusting, disease resistant varieties, diseases due to parasites, virus diseases and diseases due to non-parasitic causes.

1975. CAMPBELL, J. 633.491-2.951+2.952
 Promising new chemicals for the control of potato diseases and insects.
 Abstr. in *Amer. Potato J.*, 1948, 25: 48-9.
 Fungicides: Dithane D-14 (2 qts.-100), tri-basic copper (4-100) and others. Insecticides: 15% Parathion (2-100) for aphids, DDT.

1976. MARKHAM, R., MATTHEWS, R. E. F., AND SMITH, K. M. 633.491-2.8
 Testing potato stocks for virus X.
Farming, 1948, 2: 40-6.
 Three members of the Agricultural Research Council Plant Virus Research Unit at Cambridge describe their methods of testing potato stocks for freedom from strains of virus X which have high infectivity without producing visible symptoms. The virus is usually identified by the reaction, when inoculated with it, of indicator plants (tobacco and *Datura*), and the method of preparing the inoculum and of the symptoms produced are described and illustrated. An account is also given of a serological method of testing for the presence or absence of the virus. In this method sap is extracted from leaves known to be infected with virus X, semi-purified, and then injected into rabbits, from which, after 2 weeks, blood is extracted that yields an antiserum, which may be stored in the cold until required. This serum reacts with virus X to form a precipitate. Thus extracts from plants containing virus X produce a precipitate when mixed with the antiserum while extracts from plants free from this virus do not. The method of manipulating the rabbits and preparing the serum is given in detail and illustrated with striking photographs.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

1977. VAN DER PLANK, J. E. 633.491-2.8
 The relation between the size of plant and the spread of systemic diseases. II. The aphis-borne potato virus diseases.
Ann. appl. Biol., 1948, 35: 45-52.
 An elaboration of previous observations (*ibid.*, 1947, 34: 376). Potato haulms are reduced by short days, low temperatures, under-nutrition and varietal differences, and these factors reduce vulnerability to virus diseases. It is suggested that the transference of the potato from the short days, infertile soils and primitive cultivation on the Andes to the long summer days and productive farming of Europe and North America enhanced its vulnerability to aphid-borne virus diseases.—Division of Botany and Plant Pathology, Pretoria.

1978. LIHNELL, D. 633.491-2.8
 Virussmittan vid klyvning av sättpotatis. (Virus transmission by cutting seed potatoes.)
Växtskyddsnötiser, 1947, No. 2, pp. 17-21, illus.
 Of the four potato viruses common in Sweden, leaf roll, A, X and Y, only X need be considered in respect of possible transmission by the knife in cut seed potatoes. At the Plant Protection Institute, Stockholm, 100 tubers of two susceptible varieties were cut in half, an infected Early Puritan tuber being halved every time before cutting the experimental seed potato. The same sterilized knife was used throughout the operation. One hundred whole tubers of the same varieties were planted as controls. As virus infection appeared both in plants from halved tubers and in the controls of both varieties, one tuber of every plant was collected in autumn, and transmission tests on tobacco and *Capsicum* were carried out the following spring. The percentage of infected plants from halved and whole tubers amounted to 5 and 5, and 21 and 22 respectively in the two varieties. Although the proof has not been produced that virus X is transmitted by cutting, this possibility cannot yet be ruled out. It is noted that English workers found sprouted tubers to be more susceptible and that the potatoes used in the experiment were not sprouted.

1979. OSSIANILSSON, F. 633.491-2.8
 Överföringsförsök med potatisens Y-virus genom bladlös. (The transmission of potato virus Y by aphids.)
Växtskyddsnötiser, 1947, No. 5, pp. 68-9.
 Starved aphids were allowed to feed for 1½-2 minutes on virus Y-infected potato foliage and were then transferred to tobacco plants. *Myzus persicae* infected 6 of these out of 22, *Doradis rhamni* 8 out of 40 and *Macrosiphum euphorbiae* 3 out of 38. These results confirm the observations on virus transmission made in other countries.—Inst. for Plant Protection, Stockholm.

1980. BOTJES, J. O. 633.491-2.8
 Verandering van de ziektesymptomen in aardappelplanten, lijdende aan het A-virus. (Alteration of the disease symptoms in potato plants infected with A-virus.) [English summary 51.]
Tijdschr. PlZiekt., 1948, 54: 13-15, bibl. 2.
 Plants of the variety Eigenheimer, which for several years had shown symptoms of infection by a strong strain of A virus, were found displaying symptoms of a weak strain. The progeny of these plants sometimes showed symptoms of the strong strain and sometimes those of the weak strain.

1981. SHANDS, W. A., AND SIMPSON, G. W. 632.753: 633.491
 The production of alate forms of *Myzus persicae* on *Brassica campestris* in the greenhouse.
J. agric. Res., 1948, 76: 165-73, bibl. 9.
 The experiments described show that wild rutabaga (*Brassica campestris*) is an important host of the green peach aphid and that it may be a serious source of infestation if permitted to grow in or near potato plants.

1982. FELTON, M. W. 633.491-2.8
 The effect of temperature, moisture and nitrogen on development of leaf roll symptoms in the Irish potato.
 Abstr. in *Amer. Potato J.*, 1948, 25: 50-1.
 A temperature of 80° F., low moisture and high nitrogen were found to delay the appearance of, or even to mask, symptoms of potato leaf-roll. Nevertheless, the total yield of leaf-roll plants was less than one-half that of the healthy plants.

1983. SIMPSON, G. W., SHANDS, W. A., AND WYMAN, O. L. 633.491: 632.753: 633.51
 Weeds and the aphid-leaf-roll problem in potatoes.
Ext. Bull. Me agric. Exp. Stat. 333, 1945, 20 pp.
 Certain weeds are part-time hosts for potato aphids. Flying aphids can carry the leaf-roll virus from one field to another and their wingless progeny from diseased plants to others in a field. Weed control should thus help in reducing leaf-roll spread and the proportion of yield that is lost from aphid feeding. The more important aphid-supporting weeds are named and suggestions for their control are given.

1984. LOCKE, S. B. 633.491-2.8
 Field resistance to leafroll infection in potato varieties.
Amer. Potato J., 1948, 25: 37-43, bibl. 13, being
Pap. Wash. Coll. Agric. 741.
 Severe outbreaks of leaf-roll in seed and table potato producing areas of Washington led to the initiation of variety trials in search for a substitute for the favourite but susceptible Netted Gem variety. In tests of 23 varieties, carried out in 3 locations during the seasons 1944 and 1945, Katahdin emerged as the most resistant potato in the field with an average infection percentage of 15.9, Sequoia being second with 26.7, the average for all 23 varieties being 49.9. In the 3 most susceptible varieties, including Netted Gem, average infection amounted to 78.6%. A comparison of daily maximum temperatures and relative humidities showed that the latter was not a limiting factor for aphid flight, while temperature was found to be a major factor. It will be difficult to breed for leaf-roll resistance until the many factors contributing to the complex phenomenon of field resistance have become disentangled.

1985. FOLSOM, D., AND OTHERS. 633.491: 632.8
 Net necrosis of potatoes.
Ext. Bull. Me agric. Exp. Stat. 246, 1949, 12 pp.
 [received 1948].
 Net necrosis of potatoes is caused by the leaf-roll virus. Leaf-roll causes dwarfing of the plants, but the dwarfing is more pronounced when net necrosis is present in the seed piece than when it is absent. All seed pieces from a potato showing net necrosis will carry leaf-roll even if some of them show no discoloration. When seed potatoes are cut, any showing net necrosis should be discarded.

1986. DARLING, H. M. 633.491-2.3
 Ring rot survey [in the United States] 1940-1947.
Amer. Potato J., 1948, 25: 44-7.
 This survey, which has been compiled by the Chairman of the Seed Certification Committee of the Potato Association of America, shows that during the 8 years under consideration incidence of potato ring rot in all States averaged 7.44%.

1987. STEINBAUER, G. P. 633.491: 632.411
 Control of potato dumps reduces late blight.
Ext. Bull. Me agric. Exp. Stat. 331, 1945, 8 pp.
 The danger of late blight (*Phytophthora infestans*) spreading from untreated dumps of cull potatoes to the new crop is pointed out. Herbicides (their preparation, concentration, and precautions to be taken) useful in treating potato refuse heaps to prevent the spread of late blight are mentioned.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

1988. NEWCOMB, W. 633.491-2.411
The prevention of potato blight.
Soil and Health, 1947, 2: 135-7.
 The writer records the fact that in 3 adjacent gardens in 1945 Epicure potatoes in the central, well-composted garden were almost free from blight whereas potatoes in the other two gardens—varieties unspecified—which had received mineral fertilizers, suffered very severely.

1989. COOK, H. T. 632.411: 633.491 + 635.64
Forecasting late blight in Eastern Virginia in 1947.
 Abstr. in *Amer. Potato J.*, 1948, 25: 49.
 Forecasts of "no danger" were correct, with a consequent saving of two million dollars for the routine spraying or dusting of 60,000 acres of potatoes and tomatoes.

1990. EMILSSON, B., AND CASTBERG, C. 633.491-2.411
Undersökningar beträffande bekämpning av bladmögel och brunröta hos potatis. II. Sedimentationshastigheten hos kopparhaltiga besprutningsmedel och dess betydelse för besprutningsresultat. (Studies on the control of potato blight. II. The rate of sedimentation of copper compounds and its significance for the spraying result obtained.) [English summary 1 p.]
J. roy. Swedish Acad. Agric., 1948, 87: 85-95, bibl. 6.
 The rate of sedimentation has been determined for a number of copper fungicides. Very large differences in this respect between the different compounds were found. Bordeaux mixture 2 : 1 : 100, Perenox and Ob 2 300 had the slowest rate of sedimentation, while 3 compounds of "bordeaux powder" type settled most rapidly. The relation between stability and chemical composition of bordeaux mixture is briefly discussed. Addition of calcium carbonate had no effect on the sedimentation of bordeaux mixture 2 : 1 : 100. Spraying tests with a knapsack sprayer showed that the variations in the copper content of the spray fluid were correlated with the rate of sedimentation of the investigated compound. Compounds with a slow rate of sedimentation gave an almost constant copper content while rapidly settling compounds showed large variations. Three compounds with a very large rate of sedimentation proved to be unfit for use in the knapsack sprayer. Every compound with the exception of one was satisfactory or almost so for use in a horse-drawn spraying machine with mechanical agitator. [From authors' summary.]—Institute for Plant Investigations and Cold Storage, Nynäshamn, Sweden.

1991. LUNDEN, A. P. 633.491-2.411
Forsök med bekjempelsesmidler mot tørråte (*Phytophthora infestans*) på potet. (The control of potato blight (*Phytophthora infestans*).) [English summary 3 1/2 pp.]
Meld. Norges Landbr. Høgsk., 1947, 27: 237-70, bibl. 10, being *Meld. Åkervekstforsøk. Norges Landbr. Høgsk.* 134.
 The trials were carried out in various localities in south-eastern Norway from 1939 to 1944 with the blight-resistant potato variety Åspotet and with the susceptible Up-to-Date. Two applications of a 1% bordeaux mixture at the rate of approximately 220 gallons per acre was the standard treatment used. With the resistant variety the increase in yield over the controls amounted to a few per cent., but with Up-to-Date spraying increased the average yield by 24% and 25.1% respectively in two localities and the average tuber size by 10%. Practically the whole increase in yield occurred in the ware potato class. In both varieties the life of the foliage was extended by several weeks. This led to a decrease in yield in 1940 and to a higher percentage of diseased tubers in 1943 and 1944, when in conditions favouring blight late in the season the green foliage of the sprayed plots constituted a source of infection. Haulms should therefore be killed or cut some time before harvest. 1% burgundy mixture and three proprietary copper oxy-chloride compounds—one of them a dust—did not give quite such effective control as bordeaux, but differences were not significant. The conclusion is that spraying is profitable where very susceptible potato varieties are grown, which is hardly the case in south-eastern Norway.

1992. MÜLLER, K. O. 633.491-2.4
Über die Schadwirkung der *Rhizoctonia solani* K. bei der Kartoffel. (The damage caused to potato crops by *Rhizoctonia solani* K.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 47-51, bibl. 5.
 The author contends that the damage caused to potato crops by *Rhizoctonia solani* is generally underrated in Germany, and he undertook tests to obtain figures in support of his thesis. Inoculated tubers and controls of several varieties were planted at two depths of 14 and 6 cm. The germination of infected tubers was slower, and in one variety shoot vigour was reduced. These differences disappeared in the later part of the season, but they were still visible at flowering. Deep planting increased the effect of inoculation. A permanent characteristic of diseased tubers was the comparatively small number of shoots to which they gave rise. The reduction in yield by weight from infected potatoes amounted to 15% in the shallow-planted series and to about 30% in the deep-planted series. Differences in the number of tubers produced by diseased plants and controls were even more pronounced. Full data are presented.

1993. BERAUX, P., AND BARRY, J.-P. 633.491-2.4
Une maladie de la pomme de terre nouvelle pour la France (*Sclerotium bataticola* Taub.). (A potato disease new to France.)
Prog. agric. vitic., 1948, 129: 84-6.
 The charcoal rot (*Sclerotium bataticola*) of potatoes is recorded for the Mediterranean region of France. The symptoms and economic importance of the disease are described and its distribution is given. At present only preventive measures can be advocated. An infested plot should not grow potatoes or any other susceptible crop for several years. Grow early varieties. Handle the healthy tubers carefully to avoid bruises which allow the fungus to enter. Storage temperatures should not exceed 3-4° C. Infected tubers should not be used as seed.

1994. HOYMAN, W. G. 633.491-2.95
Potato-vine killers.
 Abstr. in *Amer. Potato J.*, 1948, 25: 52.
 A number of chemicals are named which give the most rapid kills of potato vines when applied as sprays. Tuber discoloration—occurring also in tubers harvested from untreated vines—was found to be positively correlated with the rapidity of kill; it was less when vines were killed as they approached maturity. Discoloration was further affected by the amount of moisture available during the growing season.

1995. KUNKEL, R., BINKLEY, A. M., AND EDMUNDSON, W. C. 633.491-2.95
The effect of chemical vine killers on the quality and yield of Red McClure and Triumph potatoes.
 Abstr. in *Amer. Potato J.*, 1948, 25: 54.
 In two out of three completed trials vine killing had a bad effect on quality. Dow spray 66 plus copper sulphate, in addition to its good vine killing properties, was found to be toxic to late blight spores.

1996. RAUCOURT, —, AND VIEL, —. 633.491-2.76
Évaluation de la valeur insecticide de quelques composés organiques de synthèse. (The insecticidal value of certain synthetic organic compounds.)
C.R. Acad. Agric. Fr., 1948, 34: 328-30.
 Of 8 products tested against the Colorado beetle the most

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

effective was the γ isomer of H.C.H. Next came a fluorine-DDT compound.

1997. MOROFSKY, W. F., AND MUNCIE, J. H. 633.491-2.951
Use of certain new materials in the control of potato insects in Michigan.
Abstr. in *Amer. Potato J.*, 1948, 25: 56.

The best control of potato insects in general was achieved by applications of DDT as spray or dust. Highest yields of U.S. No. 1 tubers were obtained from bordeaux 8-4-100 plus benzene hexachloride and, in the dust plots, Parathion (3422—1%). Insect counts did not correlate with yields.

1998. MAINE EXTENSION SERVICE. 633.491-2.951
The use of DDT on potatoes in Maine.
Ext. Bull. Me agric. Exp. Stat. 361, 1947, 10 pp.

A report based on the results of 3 years' experience, with a table of suggested DDT mixtures for spraying potatoes.

1999. SCHMITT, C. G. 633.491-2.651.3
Chemicals for control of the golden nematode of potatoes.
Abstr. in *Amer. Potato J.*, 1948, 25: 59.

A number of chemicals are named which proved capable, in pot tests, of killing the cysts of the golden nematode.

2000. MCCUBBIN, W. A. 633.491-2.651.3
Present status of the golden nematode of potato.
Amer. Potato J., 1948, 25: 131-3.

Soil treatments with D-D and quarantine measures have very considerably reduced the menace of the golden nematode to the American potato crop. Complete eradication of the pest, however, can only be achieved by suspension of all potato and tomato culture in infested and exposed land.

2001. LINN, M. B., APPLE, J. W., AND ARNOLD, C. Y. 633.491-2.754
Effect of leafhopper control with DDT dust on length of growing season, quality and yield of seventeen potato varieties.
Abstr. in *Amer. Potato J.*, 1948, 25: 55.

In some varieties leafhopper control lengthened the growing season by 20 days, in others by 15 days. Increases in yield and tuber quality were very considerable in a number of varieties.

2002. GIMINGHAM, C. T., AND THOMAS, I. 633.491-2.76
Colorado beetle in England, 1947.
Agriculture, Lond., 1948, 55: 55-63.

Occurrences of the Colorado beetle in England during the 1947 season and the measures taken by the Ministry to deal with them are discussed. Two maps show the finds of isolated adult beetles and the location of breeding colonies. Photographs illustrate control measures.

2003. WATZL, O. 633.491-2.76
Vorstudien und Beobachtungen über die Entwicklung des Kartoffelkäfers in Österreich. (Preliminary studies and observations on the development of the Colorado beetle in Austria.)
PflSchutz Ber., 1947, 1: 33-48, bibl. 8.

In the colder potato growing areas of Austria the Colorado beetle can develop one generation only, while in the milder regions two generations are possible, though up to now—thanks to efficient control measures—only traces of the second have been found. Incidence of the first generation reaches its peak in the second half of July, beetles of the second generation do not appear until September or October.—State Institute for Plant Protection, Vienna.

2004. BERAN, F. 633.491-2.6
Aufreten und Bekämpfung des Kartoffelkäfers in Österreich. (Incidence and control of the Colorado beetle in Austria.)
PflSchutz Ber., 1948, 2: 48-52.

The article surveys the development of the Colorado beetle

situation in Austria since 1947. So far, 75% of the potato acreage is still outside the affected area and the damage caused in the beetle regions has not been great. Every effort is made to prevent further spread.

2005. JOSSE, G. 633.491-2.76
La lutte contre le doryphore en France. (Colorado beetle control in France.)
Pomme de Terre fr., 1948, 11: 104: 18-22.

Biological control.—Investigations were interrupted by the war. Field tests with a bacterium and a fungus have not been successful. Birds, and particularly domestic poultry, eat the larvae. Breeding.—*Solanum* spp. resistant to Colorado beetle are being used in an attempt to produce resistant edible forms. Chemical control.—Various insecticides may be used. Destruction.—Small local outbreaks may be wiped out by hand picking.

2006. PEREZ, R. 633.491-2.76
Essais de lutte contre les larves de taupins (vers fil de fer) avec l'hexachlorocyclohexane (H.C.H.) à Pleyber-Christ (Finistère) en 1947. (Experiments for the control of wireworm larvae with HCH.)
C.R. Acad. Agric. Fr., 1948, 34: 641-50.

The experiments described confirm the efficacy of treating potato soils with HCH at 5 to 10 kg. per hectare.

2007. KLINKOWSKI, M., AND NOLTE, H. W. 633.491: 632.76
Stärkeres Auftreten des Kartoffelerdflohens, *Psyllodes affinis* Payk., in Mitteldeutschland. (A serious attack of the potato flea beetle in Central Germany.)
NachrBl. dtsch. PflSchDienst, 1947, 1: 105-9, bibl. 32.

A severe infestation of tomato and potato plants in Thuringia by the potato flea beetle, in 1947, is reported. It was causing much damage to tomatoes towards the end of May and, later, potatoes were severely attacked. The sudden outbreak is attributed to the warm dry weather in May. On the tomato all the leaves were liable to attack, while on the potato only the upper, the more exposed, leaves were severely affected. Wild solanaceous plants serve as hosts of the first order, followed by tomato and potato. The nightshade weeds should be eliminated in the neighbourhood of potato plots. Dusting with Gesarol is recommended for control.—Aschersleben.

2008. GLENDENNING, R., AND FULTON, H. G. 633.491: 632.768
The tuber flea beetle and its control in the coastal areas of British Columbia.
Proc. Publ. Div. Ent. Canada Dep. Agric.: No. 48, 1948, 5 pp.

The tuber flea beetle (*Epitrix tuberis* Gent) has caused increasing injury to potato tubers in the coastal areas of British Columbia since 1940. The beetle, its life-history, host plants, the injury it causes, and its dispersal are described. Recommendations for its control are early planting and five applications (at 10-day intervals) of an insecticide, starting when the plants are 3 in. high. A dust or spray containing both calcium arsenate and DDT gives the best control, and both can be used with copper-containing dusts or sprays, if protection against late blight also is required.

2009. JOHANSSON, E. 633.491-2.78
Något om jordflylarver och deras bekämpning. (Cutworms and their control.)
Växtskyddsnotiser, 1947, No. 5, pp. 78-80.

The exceptionally dry conditions of the 1947 summer favoured a severe outbreak of cutworms in potato fields near Stockholm, so that 50% of the crop had to be rejected. Poisoned bran, as applied in a nursery, was not considered suitable as a control measure, since the larvae

feed underground on the tubers. DDT proved ineffective, but a preparation of 666, at the rate of 10-15 kg. per hectare, yielded somewhat better results. However, the unpleasant smell and taste resulting from this treatment rendered the tubers unfit for consumption so that they had to be used for seed. Soil treatment after the lifting of the crop might be a solution, but it is hoped that normal weather conditions will make this unnecessary. The biology of the pest is discussed.—Inst. for Plant Protection, Stockholm.

2010. THOMPSON, M. R., AND SHUEL, R. W. 633.491-2.954

Weed control in potatoes with 2,4-D.

Amer. Potato J., 1948, 25: 163-71, bibl. 5.

A 2,4-D spray, applied at the rate of 1·2 lb. of the free acid per acre, gave excellent control of the annual broadleaved weeds in potatoes. No detrimental effect on yield or quality of tubers of the Katahdin variety was found in 1946 or 1947. A difference in varietal and seasonal reaction to 2,4-D was apparent. In 1947, the Katahdin variety showed damage to floral parts, but no damage to foliage, whereas Cobbler developed severe chlorosis, and matured without indication of recovery. The cost of spraying would be decreased if the 2,4-D could be incorporated in the regular potato sprays or dusts. Further work on varietal response is necessary before general recommendations for the use of 2,4-D in weed control in potatoes are made. [From authors' summary.]—Ontario Agricultural College.

2011. BRADLEY, R. H., AND ELLIS, N. K. 633.491-2.954

The effect of different rates of application of 2,4-D on the yield of potatoes.

Amer. Potato J., 1948, 25: 87-9; abstract *ibid.*, 1948, 25: 48.

In Indiana, where potato weeds are troublesome, applications of up to 0·875 lb. per acre of 2,4-dichlorophenoxy-acetic acid in the form of the 70% sodium salt resulted in control of weeds without significant decrease in yield of Katahdin potatoes.

2012. HARDENBURG, E. V. 633.491-2.95

Effect of sprayer-wheel injury on the yield of potatoes.

Amer. Potato J., 1948, 25: 128-30, being *Pap. Dep. Veg. Crops, Cornell Univ.* 297.

Reduction in yield from wheel injury among 21 potato varieties ranged from 10% for Virgil to 58·2% for Katahdin, the average for all adversely affected varieties being 29·2%. Season of maturity or growth habit of the variety did not seem to be related to the extent of the damage suffered. It is pointed out that, particularly in potato yield tests, the factor of sprayer-wheel injury should be taken into account.

Tobacco.

(See also 2056b, s, 2057d, 2332, 2340f.)

2013. PRODUCTION AND MARKETING ADMINISTRATION, TOBACCO BRANCH, U.S.D.A. 633.71: 31
Annual Report on Tobacco Statistics, 1947, Washington, D.C., 1947, pp. 112.

The twelfth in the series. Almost all data go back for 10 years.

2014. SALTER, R. M. 633.71(73)

Tobacco and special crops [in U.S.A.].

Report of the Administrator of Agricultural Research 1947, Bur. Pl. Industry, Soils and agric. Engng., U.S.D.A., Wash., 1948, pp. 310-13, 60 cents.

Chemical suckering Greenhouse trials indicated that the formation of suckers after the topping of tobacco plants may be retarded, or prevented, by the use of certain growth-regulating compounds applied as dust or solution to the wound left after topping. **Blue mould:** Zinc ethylene

bisdiethiocarbamate gave good results in controlling this disease. **Soil fumigation:** On soil affected with root knot increased yields of cured leaf were obtained from treatments with D-D mixture. Similar results were obtained, in less extensive tests, with ethylene dibromide. Neither treatment can be recommended at present because of their adverse effect on leaf quality. **Breeding:** Accounts are given of breeding for resistance to bacterial or Granville wilt and wildfire. The only satisfactory source of resistance was the selection T.L. 448 A from Columbia. One selection resistant to Granville wilt, Oxford 26, has been released. After years of effort, *Nicotiana longiflora*, which is highly resistant to wildfire, was crossed with the cultivated form. **Root knot control:** Two years of bare fallow gave the best control; 2 years under groundnuts was almost as good; native weeds, velvet beans and cotton gave some control; maize, sweet potatoes and susceptible cowpeas gave none. **Quality:** At present tobacco quality is based entirely on physical character as determined visually. Fortunately a high degree of correlation usually exists between physical appearance and composition, but some samples, which passed all visual tests, have been found entirely unsuitable when analysed chemically. New disease-resistant strains now being developed are required to pass chemical and physical composition tests.

2015. CUZIN, J., AND SCHWARTZ, D. 633.71

Étude statistique de la croissance du tabac sur le champ. (A statistical study of the growth of tobacco in the field.)

Ann. agron. Paris, 1948, 18: 39-59, bibl. 4.

In a study of the growth of tobacco on a plot basis, analysis was made of the mean number of leaves, and of wilted, vacant, and flowering stands. How these are influenced by soil, fertilizers, and labour is considered. It is recommended that labourers should be assigned to plots by a process of randomization, because they differ considerably in their effect on the plants.—Institut des Tabac, Bergerac.

2016. ANON. 633.71(417)

Tobacco growing and curing [in Eire].

Pamphl. [unnumbered] Dep. Agric., Eire, 1941, pp. 15 [received 1948].

A guide for growers. A brief note on the regulations governing the growing and handling of tobacco in Eire [1941] is followed by practical advice on growing and curing the crop, the removal of leaf to the rehandling station, and the construction of curing barns.

2017. MOSS, E. G., AND TETER, N. C. 633.71-1.56

Bright leaf tobacco curing.

Bull. N.C. agric. Exp. Stat. 346, 1946, pp. 27, bibl. 10.

The technique of bright leaf tobacco curing is described and suggestions are made for overcoming various difficulties. The following recommendations are made for improving the efficiency and economy of tobacco curing: the installation of automatic stoking, the use of a heating jacket (in which fresh air is pre-heated) round the first joint of the flue, the use of a hygrometer in regulating ventilation, and better insulation of the barn.

2018. GIOVANOZZI, M. 633.71-1.56

Studi sulla fermentazione dei tabacchi. XI Nota—Sulle temperature della masse per sigari toscani e sviluppi microbici, e nuovi confronti tra terreni colturali per la numerazione. (Fermentation studies No. XI.)

Il Tabacco, 1948, 52: 582: 3-15, bibl. 5.

In the fermentation of Kentucky tobacco destined to make Tuscany cigars ("Toscani") the temperatures reached at certain points in the tobacco reach and sometimes even exceed 60° C., though most of the tobacco is subject to temperatures of 40-50° C., which are fairly favourable to bacterial development. Turning the mass results in the

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

whole body being subjected in due course to the bacterial action set up. An ordinary meat agar, pH 7.5, is found to be a more satisfactory medium than the potato, glucose agar proposed by Mitschhoff for bacterial counts.

2019. GUNDY, B. G., AND BROWN, D. D. 633.71-1.56
Buildings for Virginia type flue-cured tobacco.
Rhod. agric. J., 1948, 45: 39-68.

A highly practical article with 13 sheets of working drawings and a plan showing a suggested lay-out. The subject is dealt with under: lay-out of buildings; fire risks and insurance; the construction of flue-curing barns of 2 sizes; the Townsend barn; barn fires; barn heating systems; the various types of furnaces, including the T.R.B., the Townsend, and the Grundy; flues; grading and bulking sheds; notes on building construction, etc.

2020. MIDDDELBURG, H. A. 633.71-1.56
Bereiding van Virginia-tabak. (Flue curing of tobacco.) [English summary 1 p.]
Landbouwk. Tijdschr., 1948, 60: 173-9, bibl. 4.

During the main period of yellowing (36 hours) the wet bulb temperature should be maintained between 32° and 38° C.; the colour should be fixed at 39° to 54° C. (24 hours); in drying, which takes 2½ days, the temperature should be raised from 55° to 80° C. The enzyme action responsible for the early changes is discussed.

2021. ALCARAZ MIRA, E., AND DE LA BORBOLLA Y ALCALÁ, J. M. R. 633.71: 581.192
La combustibilidad y la composición química de tabacos españoles. (Combustibility and chemical composition of Spanish tobaccos.) [Summary in German, English and French.]
Bol. Inst. Invest. agron. for. Madr., 1946, No. 15, pp. 97-128, bibl. 30.

A bibliographical study is made of the relations between chemical composition of tobacco and its combustibility. Spanish and foreign tobaccos are compared. The average combustibility of the tobaccos analysed is rather good and improvement by suitable fertilizers is considered possible.

2022. DE LA BORBOLLA Y ALCALÁ, J. M. R., AND DE CASTRO BRZEZICKI, A. 633.71: 581.192
El método sintético en el estudio químico de la combustibilidad. (The synthetic method in the chemical study of burning tobacco.) [Summary in French, English and German.]
Bol. Inst. Invest. agron. for. Madr., 1947, No. 17, pp. 257-88, bibl. 8.

The quality of Spanish tobacco is studied in relation to the elements present at the moment of its burning, and their influence in the soil on the plant's metabolism is considered. The presence of chlorine in the soil and irrigation water is important for the cultivation of Spanish tobaccos.

2023. ANON. 633.71
Forsøg med Afbrydning af Topskud og Sideskud på Tabak (*Nicotiana tabacum*), 1940-1946. (Stopping main and side shoots of tobacco. Trials 1940-1946.)
Tidsskr. Planteavl., 1948, 51: 734-5, being *Meddel.* 398.

The trials show that the early stopping of main and side shoots in tobacco increases leaf yield but is accompanied by a loss in quality. The operation should therefore be postponed until the first white flowers begin to drop. Further delay entails, in addition to a decrease in yield, high losses in drying and fermenting.—Aarslev Research Station, Denmark.

2024. TRACEY, M. V. 633.71: 581.192
Leaf protease of tobacco and other plants.
Biochem. J., 1948, 42: 281-7, bibl. 15.

Describes work on the properties and activities of protein- and peptide-splitting enzymes (proteases) of the green leaves of tobacco and other plants.—Rothamsted Exp. Stat.

2025. SMEE, C. 633.71
Tobacco seed-bed shades of sunnhemp.
Nyasaland agric. J., 1943, 3: 2: 11-12 [received 1948].

It has been reported in Nyasaland that tobacco seed beds shaded by sunnhemp stalks, instead of the usual grass shade, have failed, and it is suggested that a plant growth inhibiting substance may be present.

2026. SACCO, P. 633.71-2.3
Mineral absorption and resistance to wildfire in tobacco.
Publ. Univ. Microfilms Ann. Arbor 901, 1947, pp. 30-4.

The conclusion was reached from the experiments described, that in the absence of a sufficient supply of either calcium or potassium and in the presence of high nitrates, tobacco plants are more susceptible to the wildfire organism (*Bacterium tabacum*) regardless of the level of the other ion. The application of high potassium fertilizers should be encouraged in tobacco culture, for K is required in proper proportion and intensity to bring about favourable yields and other desirable characteristics.

2027. TAKAHASHI, W. N., AND RAWLINS, T. E. 633.71-2.8
An electron microscope study of tobacco mosaic virus extracted from pulp and juice after various periods of infection.
Phytopathology, 1948, 38: 279-82, bibl. 5.

When tobacco mosaic virus is extracted from finely macerated pulp and juice at the pH of plant juice the proportion of short particles increases between 4 and 16 days after infection.

2028. BEST, R. J. 632.8: 633.71
Further studies on the physical states assumed by tobacco mosaic virus *in vitro*.
Reprinted from *Aust. J. exp. Biol. med. Sci.*, 1947, 25: 283-90, bibl. 11.

Data concerning the physical states assumed by pure preparations of tobacco mosaic virus at various concentrations of virus and NaCl are presented and discussed.—Waite Agricultural Research Institute, University of Adelaide.

2029. SMITH, T. E., AND CLAYTON, E. E. 633.71-2.3
Resistance to bacterial wilt and black shank in flue-cured tobacco.
Phytopathology, 1948, 38: 227-9.

In the experiments described linkage increased the number of segregates with combined resistance to wilt (*Bacterium solanacearum* E. F. Smith) and black shank (*Phytophthora parasitica* var. *nicotianae* Tucker), and the results show that a flue-cured variety of tobacco with high resistance to both diseases can probably be developed without raising excessively large populations.—North Carolina Agricultural Experiment Station.

2030. WOLF, F. T., AND WOLF, F. A. 633.71-2.4
A toxic metabolic product of *Fusarium oxysporum* var. *nicotianae* in relation to a wilting of tobacco plants.
Phytopathology, 1948, 38: 292-8, bibl. 28.

When cultivated in a modified Richards' solution this fungus produces toxins which cause necrosis and wilting of tobacco plants.

2031. MOFFETT, A. A. 633.71-2.76
The use of Gammexane for the control of white grubs and wireworms in tobacco lands.
Rhod. agric. J., 1948, 45: 132-46.

An account of field trials carried out during 1946-48 in which Gammexane (gamma isomer of benzene hexachloride) proved effective for controlling white grubs (*Anomala*, *Schizonycha*, *Adoretus*) and false wireworms (*Psammodes*

similis) in tobacco lands.—Tobacco Res. Stat., Trelawney, S. Rhodesia.

Other crops.

(See also 1550.)

2032. CROOKS, D. M. 633.8

Plants for special uses.

Econ. Bot., 1948, 2: 58-72.

An account of attempts to cultivate in the United States various plants whose essential products are normally imported. Most of the condiments and medicinals tried were grown successfully, but uneconomically. Insecticides.—Pyrethrum is being bred for disease resistance and increased pyrethrins, and picking machines have been designed. An attempt is being made to improve devil's shoestring, *Tephrosia virginiana*, as a domestic source of rotenone. Careful cultivation of *Nicotiana rustica* has produced yields of 300 lb. nicotine per acre. Tannin.—Experimental plantings have been made of the sumacs, *Rhus* spp., and the mechanized cultivation of improved strains of canaigre, *Rumex hymenosepalus*, may place tannin production on a farm-crop basis. Oil seeds.—Safflower, *Carthamus tinctorius*, has given good crops under irrigation in the warmer states. The renewed domestic cultivation of castor, *Ricinus communis*, depends on improvement of the plant to facilitate mechanical harvesting.

2033. ROGER, J. G. 633.88

British poisonous plants.

North. Gdmr., 1948, 2: 310-12; 3: 27-9, 48-50, 78-80, 412-14; 4: 43-5, 60, 61.

Hemlock water dropwort, *Oenanthe crocata*; deadly nightshade, *Atropa belladonna*; monkshood, *Aconitum anglicum*; foxglove, *Digitalis purpurea*; yew, *Taxus baccata*; hemlock, *Conium maculatum*; black nightshade, *Solanum nigrum*. The botanical description of each plant is supplemented by a line drawing. Poisonous properties and symptoms are recorded. Common synonyms are given.

2034. WOOD, E. J. F. 578.6: 63(94)

Agar in Australia.

Bull. Coun. sci. industr. Res. Aust. 203, 1946, pp. 43, bibl. 69, illus., being *Rep. Div. Fish.* 12 [received 1948].

Agar is manufactured from *Gracilaria confervoides* on the east coast of Australia; in Western Australia a smaller industry is based on *Eucheuma* spp. The properties of agar, methods of testing it and manufacturing processes are described. The possibilities of the industry in Australia are discussed.

2035. ANON. 578.6

O problema do agar-agar em Portugal: uma indústria nascente. (The agar-agar problem in Portugal: a growing industry.)

Rev. agron., Lisboa, 1944, 32: 69-75 [received 1948].

The difficulty of obtaining agar for bacteriological work in Portugal during the war led to an investigation of seaweeds around the coast of Portugal in order to find a substitute for the Japanese agar-agar. The most promising was found to be *Gelidium corneum*, which could be collected without great difficulty and which compared favourably with the Japanese product. It is considered possible to build up an industry for supplying agar not only for use in Portuguese institutions but also abroad.

2036. BROWN, B. M., AND OTHERS. 633.79: 663.4

Brewing trials with varieties of hops showing some resistance to *Verticillium* wilt.

J. Inst. Brew., 1948, 54: 105-6.

The results of brewing trials, with *Verticillium*-resistant hops described in the Annual Report of the East Malling

Research Station for 1946 (*H.A.*, 17: 2349), are here tabulated. With the possible exception of one variety (No. 219), these hops are all acceptable for brewing.

2037. BONNET, J. 633.79-1.8

L'absorption des éléments nutritifs par le houblon au cours de l'année 1945. (The absorption of nutrients by hops in 1945.)

Bull. Inst. agron. Gembloux, 1945, 14: 3-17, illus.

Since 1941, observations have been made with a view to determining what hops require from the soil, and absorption curves have been obtained with the means of four years. Large differences were observed in the needs of the various cultivated varieties. [From author's summary.]

2038. BORG, A. 633.79-2.78

Ett angrepp av majsmottet på humle. (The European corn borer attacking hops.)

Växtskyddsnotiser, 1947, No. 6, pp. 93-4.

The first record of *Pyrausta nubilalis* on hop in Sweden. Affected vines should be cut back to the ground and burnt.—Inst. for Plant Protection, Stockholm.

2039. BEHR, L. 633.81-2.53

Cuscuta arvensis Beyrich (*C. campestris* Yuncker) als Parasit des Bohnenkrautes (*Satureja hortensis* L.).

(Dodder as a parasite of summer savoury.)

NachrBl. dtsch. PflSchDienst, 1947, 1: 109-10, bibl. 6.

In central Germany a 2½-acre summer savoury field was found to be practically 100% attacked by *Cuscuta arvensis*. Probably the parasite had been introduced from Hungary with the seed. The savoury was cut early and as low as possible, care being taken that no parts of *Cuscuta* were left on the field. In recent years *C. australis* var. *breviflora* has also been observed to cause heavy damage to *Satureja* in certain parts of Germany. Earlier *C. Gronovii* was reported from northern Bohemia as a parasite of the crop.

2040. BAKER, K. F. 633.842-1.531

The coat-bound condition of germinating pepper seeds [*Capsicum frutescens*].

Amer. J. Bot., 1948, 35: 192-3, bibl. 10.

Pepper and tomato seedlings sometimes emerge from the soil with the cotyledons still enclosed in the seed coats. Release of the cotyledons and plumule may not then be accomplished, or may occur tardily, when unusually rapid drying hardens the seed coat. This economically important coat-bound condition may be prevented by keeping the air humidity and surface-soil moisture at a high level by various means. [Author's summary.]—University of California, Los Angeles.

2041. VOLCANI, Z., AND DOWSON, W. J. 633.842-2.3

A plant disease caused by a spore-forming bacterium under natural conditions.

Nature, 1948, 161: 980, bibl. 3.

One of the rare cases in which a spore-forming bacterium has been proved to be a plant pathogen is that of *Bacillus polymyxa*, which causes widespread fruit-spot of green pepper in Palestine. Inoculation experiments showed that *B. polymyxa* is a wound parasite of the fruit; leaves are not susceptible. Various vegetables infected with the organism developed a typical soft rot of the parenchyma.—Agric. Res. Stat. Rehovot, Palestine, and Botany School, Cambridge.

2042. LEYENDECKER, P. J. 633.842-2.411

An epiphytotic of pepper blight caused by *Phytophthora capsici* in southern New Mexico.

Plant Dis. Repr., 1947, 31: 421-2.

Infected pods became dry and mummified 4 to 5 days after the entry of the fungus. Stem infections caused the death of the plants.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

2043. McKEEN, C. D. 633.842-2.4
An occurrence of soft rot in peppers and its relation to the corn borer.
Sci. Agric., 1948, 28: 142-3, bibl. 1, being Contr. Div. Bot. Pl. Path. Sci. Serv. Dep. Agric. Canada 926.

Due to *Erwinia carotovora* following damage by larvae of the European corn borer, *Pyrausta nubilalis*.

2044. FRAILE OVEJERO, A. 633.85
*Contribución al estudio del *Peganum harmala* L. (A study of the Turkey-red oil plant.) [Summary 1½ pp.]*
Farmacognosia-Anal. Madr., 1947, 6: 11: 103-62, bibl. 72.

Peganum harmala, the seeds of which yield Turkey-red oil, its ecology, history, number of seeds per fruit, their average weight and relation to the total weight of the fruit, and their mode of germination are described. Morphological, histological and microchemical data are reviewed, and the technique of obtaining and estimating the alkaloids is given with the author's modifications.

2045. PUGSLEY, A. T., AND WINTER, G. 633.854.797
Safflower: a potential oil crop for paint.
Rep. Munitions Supply Lab. 171, 1947, (Publ. Dep. Mun., Commonwealth of Australia, pp. 57, bibl. 80, illus.

Part I of the report reviews the literature of the subject and records the results of field experiments (1940-46) which showed that safflower (*Carthamus tinctorius*) can be grown in the cereal belt of South Australia, using the same machinery for sowing and harvesting as used for wheat. Sown in May or June, the crop ripened in January. The yields obtained (up to 1,680 lb. per acre) compared favourably with those from other parts of the world. An average yield of about 25% of oil in the seed can be expected. Of the several varieties tried, the large-seeded varieties, such as Niphad 630 from India, proved superior to the small-seeded types. Part II is devoted to the evaluation of safflower-seed oil for paints.

2046. BAGGE, H. 633.859
Kulturforsøg med Opiat-Valmue 1941-1946. (Cultural trials with opium poppy 1941-1946.)
Tidsskr. Planteavl, 1948, 51: 587-615, being Beretn. St. Forsøgsvirks. Plantekult. 410.

While before the last war opium poppy cultivation was not profitable in Denmark, the seed has now become an article of export, and the area devoted to the crop embraced about 1,430 hectares in 1946. The results of 6 years' trials show that (1) the best sowing date is about 1st April; (2) the optimum distance between rows is 40-45 cm. on loam soil and 60 cm. on sand soil; (3) 2 kg. seed should be used per hectare, the plants being thinned, on the appearance of the first true leaves, either to "hills" 20 cm. apart with 2-4 plants per hill, or to 25 plants per m. of row.

2047. LEDEBOER, M. S. J. 633.879-1.534
Vegetative propagation of tan wattles.
J. S. Afr. For. Ass., 1944, 12: 29-32, bibl. 2, illus. [received 1948].

In experiments to determine the best method of propagating *Acacia mollissima* it was found that cuttings developed neither callus nor roots. A method of layering, similar to marcottage, and giving promising results, is described.

2048. LEDEBOER, M. S. J. 633.879-2.4
**Schizophyllum commune* as a wound parasite: a warning to wattle growers.*
J. S. Afr. For. Ass., 1946, 13: 39-40 [received 1948].

It appears that the potentially parasitic character of *Schizophyllum commune* is still not generally recognized. Several cases of young trees withering are quoted, in some of which this fungus was isolated from the discoloured wood. The attention of wattle growers is drawn to the dangers of excessive, and often unnecessary, pruning of black wattle (*Acacia mollissima*) which, apart from providing entry for wood invaders, may also be associated with severe gumming.

2049. SAN MARTIN, R., AND GIRAU, L. 633.88
*Contribución al estudio farmacognóstico de algunas especies de *Atropa* y particularmente de un híbrido interspecífico. Nota 4.^a Histología comparada de la hoja. (The pharmacology of certain *Atropa* species, particularly of an inter-specific hybrid. Comparative leaf histology.)*
Farmacognosia-Anal. Madr., 1947, 6: 10: 81-90.

Some slight differences were detected in the shape and size of the stomata, and in the adjoining epidermal cells.

2050. SERRANO, M. 633.88
Contribución al estudio del regaliz español. (The Spanish liquorice plant.)
Farmacognosia-Anal. Madr., 1946, 5: 9: 9-74.

A study of the metabolism of glycyrrhizin in the root of the liquorice plant *Glycyrrhiza glabra* var. *a-típica* under the rather extreme climatic conditions within the area of its distribution in Spain. The conclusion is reached that glycyrrhizin is a reserve substance attaining a maximum in May and diminishing to a minimum in August. Methods of preparing and estimating it are reviewed.

2051. RECALDE MARTINEZ, L. 633.88
*Contribución al estudio histológico de la hoja de "*Atropa baetica*" Wilk. y su híbrido con la "*Atropa belladonna*" L. (The histology of the leaf of *Atropa baetica* and its hybrid with *A. belladonna*.)*
Farmacognosia-Anal. Madr., 1947, 6: 11: 29-46, bibl. 19.

The three forms can be distinguished by the septation of the glandular hairs of the leaves.

2052. SALTER, R. M. 633.912 +633.913
Rubber plants [and policy in America].
Report of the Administrator of Agricultural Research 1947, Bur. Pl. Industry, Soils, and agric. Engng. U.S.D.A., Wash., 1948, pp. 305, 306. 60 cent's.

Rubber research continued toward long-term objectives that now form part of a national rubber policy; viz. (1) continued encouragement of a substantial competitive hevea-rubber-producing industry in Latin America, and (2) breeding and selecting such domestic rubber-bearing plants as guayule and kok-saghyz that can be grown within the United States and from which stock piles of seed would enable quick rubber production in any future emergency. The breeding of *Hevea* for high yield and disease resistance was resumed in Florida after the interruption caused by the 1945 hurricane. By cutting back large seedlings to 5-8 ft. and allowing as many as 4 shoots to develop, they can be topworked with one or more scions and flowers obtained from them within 1 or 2 years, as compared with 4 or 5 years for trees budded in the usual way.

2053. METCALFE, C. R. 633.913
Lesser rubber plants.
Research, 1948, 1: 438-46, bibl. 10, illus.

Most of this paper is devoted to an account of wartime experiments with *Taraxacum kok-saghyz* in the United Kingdom. Other rubber plants mentioned are guayule, *Cryptostegia grandiflora*, *Landolphia* spp. and *Carpodinus lanceolata*. In the present state of knowledge none of them can be exploited to compete with *Hevea brasiliensis*.

2054. MIRSKI, A. 633.913: 632.5
*Las especies de *Taraxacum* no cauchíferas como malas hierbas en las plantaciones de kok-saghyz. (Non-rubber-producing species of *Taraxacum* as weeds in kok-saghyz plantations.)*
Farmacognosia-Anal. Madr., 1947, 6: 10: 69-78.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

A table shows the morphological characters which distinguish the weeds from kok-saghys, and four species and a kok-saghys hybrid are described.

2055. BANNAN, M. W. 633.913
 Tetraploid *Taraxacum kok-saghys*. IV. Comparison of second generation families.
Canad. J. Res., 1948, 26, Sec. C, pp. 115-26, bibl. 21.

Root development was found to be genetically determined. Tetraploids have an advantage over diploids in that they flower sparsely or not at all in the first year, the sparsity or absence of flowering being associated with vigorous rosettes and large roots.—Toronto University.

Noted.

2056.

a ÅBERG, E. 635.656(515)
 Cereals and peas from Eastern Tibet and their importance for the knowledge of the origin of cultivated plants.
Ann. agric. Coll. Sweden, 1948, 15: 235-50, bibl. 26.

b ALCARAZ MIRA, E., AND IZQUIERDO TAMAYO, A. 633.71
 Estudios de tetraploidía en el género Nicotiana. II. Obtención de nuevos tetraploides y estudio de las descendencias de los ya obtenidos. (*Tetraploidy in the genus Nicotiana*. II. New tetraploids and a study of the progeny of those previously obtained.) [Summary in German, French and English.]
Bol. Inst. nac. Invest. agron. for. Madr., 1947, No. 17, pp. 1-75, bibl. 12.

c ANDREAE, W. A. 633.491-2.8
 The isolation of a blue fluorescent compound scopoletin, from Green Mountain potato tubers, infected with leaf roll virus.
Canad. J. Res., 1948, 26, Sec. C, pp. 31-4, bibl. 6.

d BANGA, O. 635.11: 581.143.26.03
 Vernalisatie en devernalisatie van bieten. Een overzicht van enige gegevens uit de literatuur. (*Vernalization and devernalization of beets. A review of published data.*)
Meded. Direct. Tuinb., 1948, 11: 324-47, bibl. 10, illus.

e BARIBEAU, B. 633.491-2.3
 Bacterial ring rot of potatoes.
Amer. Potato J., 1948, 25: 71-82, bibl. 175.
 A concise review of present position.

f BEHR, L. 635.63: 632.4
 Über einige Ergebnisse histologischer Untersuchungen an Krätzekranken Gurken (*Cucumis sativus L.*) (Vorläufige Mitteilung). (Histological investigations on cucumbers affected with gummiosis (*Cladosporium cucumerinum*). Preliminary communication.)
NachrBl. disch. PfSchDienst, 1947, 1: 121-2.

g BONDE, R., AND LIBBY, W. C. 633.491-9
 Spraying and dusting potatoes [in Maine].
Me Ext. Bull. 290, 1940, pp. 14, illus. [received 1948].

h BONDE, R., AND WYMAN, O. L. 633.491: 632.3
 Potato ring rot (bacterial wilt and soft rot).
Me Ext. Bull. 286, 1941, 8 pp. [received 1948].

i HEY, G. L. 632.654.2: 632.944
 Control of the greenhouse red spider with azobenzene smoke.
 Reprinted from *Grower*, 1948, 9 pp.
 See *H.A.*, 18: 1174.

j HILL, R. E. 633.491-2.6/7
 Research on potato insect problems—a review of recent literature.
Amer. Potato J., 1948, 25: 107-27, bibl. 108, being *Pap. J. Ser. Neb. agric. Exp. Stat.* 443.

k HOOKER, W. J., AND SASS, J. E. 633.491-2.3
 Some histological features of potato stem necrosis associated with *Actinomyces scabies*.
 Abstr. in *Amer. Potato J.*, 1948, 25: 51.

l HOOKER, W. J., AND SASS, J. E. 633.491-2.3
 Evidence of parasitic activity of *Actinomyces scabies* on seedling roots.
 Abstr. in *Amer. Potato J.*, 1948, 25: 51-2.

m HOVEY, C., AND BONDE, R. 633.491-2.8
Physalis angulata L. a test plant for the potato leaf roll virus.
 Abstr. in *Amer. Potato J.*, 1948, 25: 52.

n HUME, E. P., AND WINTERS, H. F. 634.74
 Tomatoes from a tree [*Cyphomandra betacea*].
Foreign Agric., 1948, 12: 121-2.
 The tree tomato in Puerto Rico.

o KIRKPATRICK, H. C. 633.491-2.8
 Indicator plants for studies with the leaf roll virus of potatoes.
 Abstr. in *Amer. Potato J.*, 1948, 25: 53.
Datura stramonium, *Physalis angulata*, *P. floridana*.

p McCALLAN, S. E. A. 635.656: 631.531.17
 Evaluation of chemicals as seed protectants by greenhouse tests with peas and other seeds.
Contr. Boyce Thompson Inst., 1948, 15: 91-117, bibl. 15.

q MCLEAN, J. G., KUNKEL, R., AND LANE, G. 633.491-2.8
 A comparison of chemical tests with the ultraviolet technique in testing potatoes for virus diseases.
 Abstr. in *Amer. Potato J.*, 1948, 25: 56.

r MAI, W. F., AND LOWNSBERY, B. F., Jr. 633.491-2.651.3
 Studies on the host range of the golden nematode of potatoes, *Heterodera rostochiensis*.
 Abstr. in *Amer. Potato J.*, 1948, 25: 55.

s MARKHAM, R., AND SMITH, K. M. 633.71-2.8
 Molecular arrangement in tobacco necrosis virus crystals.
Nature, 1948, 161: 760-1, bibl. 3.

t MARSCHALL, F. 635.65(494)
 Die Buschbohnensorten der Schweiz. (The dwarf bean varieties grown in Switzerland.)
Landw. Jb. Schweiz, 1948, 62: 37-67, bibl. 8.

u MATTISON, H. 633.491
 New potato varieties introduced in 1947.
Amer. Potato J., 1948, 25: 133-4.

v NILSSON, F., AND LINDWALL, H. 635.1/7
 Sortförsök med köksväxter i Norrland. II. Palsternackor, kålrötter, rotsselleri, frilandsgurkor, frilandstomatör och lök 1938-1947. (Vegetable variety trials in northern Sweden. II. Parsnip, swede, celeriac, pickling cucumber, tomato and onion, 1938-1947.) [English summary 1 p.]
Meddel. Statens Trädgårdsförs. 41, being reprint from *Alnarps Lanbr.- Mejeri- Trädgårdsinstit.*, 1947, pp. 189-208, bibl. 5.

w ORMAN, A. C. 635.656
Growing green peas [in New South Wales].
Agric. Gaz. N.S.W., 1948, 59: 65-8.

x OSWALD, J. W. 633.491-2.8
A virus causing internal necrosis in White Rose potato.
Abstr. in *Amer. Potato J.*, 1948, 25: 57.

y PRATT, A. J. 633.491-2.411
Yield and grades of blight resistant potatoes grown in twenty different locations in New York State.
Abstr. in *Amer. Potato J.*, 1948, 25: 57.

z PRATT, A. J., KELLY, W. C., AND SOMERS, G. F. 633.491: 581.02
Effect of location and date of planting on yield and grade of certain varieties of potatoes.
Abstr. in *Amer. Potato J.*, 1948, 25: 58.
Effect is considerable.

2057.

a PRICE, W. C., AND HOLT, B. R. 635.65: 632.8
Kentucky Wonder bean plants as hosts for measuring Southern bean mosaic virus activity.
Phytopathology, 1948, 38: 213-17, bibl. 10.

b RADEMACHER, B. 631.521.6
Übersicht über die resistenten deutschen Züchtungsorten der wichtigsten landwirtschaftlichen Kulturgewächse. (A survey of resistant varieties of the most important agricultural crop plants bred in Germany.)
Nachrbl. dtisch. PflSchDienst, 1947, 1: 81-7, bibl. 71.
Includes potatoes.

c RIEMAN, G. H., AND HOUGAS, R. W. 633.491-2.3
Resistance of new potato varieties to common scab in Wisconsin.
Abstr. in *Amer. Potato J.*, 1948, 25: 59.

d SEQUEIROS BORES, J. M. 633.71(46)
Algunas características agrológicas de las zonas tabaqueras españolas, zonas 4.^a y 8.^a (provincias de Cáceres y Ávila): I. Análisis mecánico. Determinaciones físicas y análisis orgánico. (Some agricultural characteristics of certain tobacco growing zones of Spain. I. Mechanical analysis, physical determinations and organic analysis.)
Bol. Inst. nac. Invest. agron. for. Madr., 1946, No. 15, pp. 195-227, bibl. 12.

e SØRENSEN, H. 635.656
Sortsforsøg med lave Marv-og Sukkeraarter 1943-45. (Variety trials with marrowfat and edible-pod pea varieties 1943-45.)
Tidskr. Planteavl., 1947, 51: 147-68, being Beretn. St. Forsøgvirks. Plantekult. 403.

f STARR, G. H., AND RIEDL, W. A. 633.491-2.3
A comparison of *Corynebacterium sepedonicum* [ring-rot] inocula from resistant and susceptible potato varieties.
Abstr. in *Amer. Potato J.*, 1948, 25: 59.

g SUTULOV, A. N. 633.491
The substances determining the smell and taste of potato. [Russian.]
Priroda (Nature), 1948, No. 2, pp. 56-7.
A review of an article by W. Kröner and H. Wegner (*Naturwiss.*, 1942, 30: 586).

h TAKAHASHI, W. N. 635.61: 632.8
Crystallization of squash mosaic virus.
Amer. J. Bot., 1948, 35: 243-5, bibl. 18, illus.

i VILLAR PALASI, V. 633.88
Saponinas en el reino vegetal. Contribución al estudio de las saponinas esteroideas. (Vegetable saponins. The steroid saponins.)
Farmacognosia-Anal. Madr., 1947, 6: 11: 47-100, bibl. 302.

FLORICULTURE.*

(See also 1584, 2302, 2326.)

2058. DROUINEAU, G., AND GOUNY, P. 635.936.69: 631.8
La fertilisation des cultures florales. Le rôle des fumures organiques en sols calcaires. (Manuring flowers: organic fertilizers in calcareous soils.)
C.R. Acad. Agric. Fr., 1948, 34: 212-14.
From a cultural study of carnations the author finds that a deficiency of organic matter in the calcareous soils, poor in phosphoric acid, of southern France, may lead to nutritional troubles.

2059. CHENERY, E. M. 581.175.111: 546.621
Aluminium in plants and its relation to plant pigments.
Ann. Bot., Lond., 1948, 12: 121-36, bibl. 34.
In the search for plants showing colour changes similar to those occurring in hydrangea flowers, large numbers of aluminium-accumulators were found; *Faramea anisocalyx*, *Palicourea alpina* and *P. nigricans* accumulate aluminium and are reported to have flowers of various colours. A large proportion of the blue-fruited plants examined also accumulated aluminium.—Department of Agriculture, Trinidad.

2060. MATTHEWS, B. 631.875
Report on sawdust.

N.Z. Gdr., 1948, 4: 391-4.
An account of the virtues of sawdust as a mulch in the flower garden. It should be applied after rain, with a complete fertilizer at the rate of 2 oz. per square yard.

2061. HAMNER, C. L., GARTNER, J. B., AND O'ROURKE, F. L. 635.975
A non-toxic plastic coating to improve the keeping quality of cut foliage.
Quart. Bull. Mich. agric. Exp. Stat., 1948, 30: 268-71.
SHERWOOD, C. H., AND HAMNER, C. L.
Lengthening the life of cut flowers and floral greens by the use of plastic coatings.
ibid., 1948, 30: 272-6.
Geon 31X is a polyvinyl resin, which can be applied to flowers and foliage as 10 to 20% aqueous solution; when dry it forms a protective coating which greatly reduces transpiration.

2062. LIHNELL, D. 635.966: 664.85
Något om äpplets inverkan på snittblommor. (The effect of apples on cut flowers.)
Växtskyddsnotiser, 1947, No. 5, pp. 65-7, illus.
When cut carnations travelled together with apples in a railway wagon, the flowers shed their petals and arrived in an unsaleable condition. In order to study the phenomenon, carnations were placed under a 10-litre glass jar at 15-17° C. together with 5 Cox's Pomona apples. After two days the flowers began to droop and after 5 days they were mouldy and had faded completely, while the controls remained fresh for several more days. Cut roses were

FLORICULTURE

found to be even more susceptible to apple emanations, but chrysanthemums proved fairly resistant. The transport or storage of flowers with fruit which gives off ethylene must be avoided.—Institute for Plant Protection, Stockholm. See also *H.A.*, 16: 2164.

2063. MINDERHOUD, A. 635.9: 638.12
Over het leiden van bijen naar bepaalde drachtplanten. (How to direct bees to particular forage plants.)

Meded. Direct. Tuinb., 1948, 11: 381-92.

The author discusses methods of attracting bees to flowers in order to induce or increase pollination. With *Petunia hybrida*, a plant not normally visited by bees, he found that promising results were obtained by spraying with 50% saccharose.

2064. MARTIN, H. 546.23: 632.952: 635.9
Selenium treatment is dangerous.
Grover, 1948, 29: 701.

A warning against the use of selenium for controlling pests in flower crops. There is inconclusive evidence that selenium, taken up by plants and fed to warm-blooded animals, induces sterility. It persists indefinitely in the soil.

2065. POST, K. 635.939.98
Chrysanthemum troubles of 1947.

Bull. N. York St. Flower Grs 27, 1947, pp. 4-6.

Various disturbances in flowering are associated with length of day, which may be shortened by cloudy weather at the critical period for flower bud formation. Faulty development of the central florets may be due to excessive temperature. Measures to overcome these troubles are described.—Cornell University.

2066. BARRERA RIBER, R. 589.31(46)

Jazmines empleados en jardinería (Contribución al estudio botánico-agrónomico del género *Jasminum*). (Garden jasmines: a botanical-agronomical study of the genus *Jasminum*.) [Summary in German, French and English.]
Bol. Inst. nac. Invest. agron. for. Madr., 1947, No. 17, pp. 189-236, bibl. 7, illus.

A historical survey of the cultivation of jasmines in Spain, and a description, with key, of the principal classes and varieties.

2067. GARRARD, E. H. 635.937.36: 632.3
Fasciation of sweet peas.

Canad. J. Res., 1948, 26, Sec. C, pp. 158-63, bibl. 7.

Agrobacterium tumefaciens was isolated from the abnormal tissue of a fasciated sweet pea plant. Fasciation, dwarfing, swollen roots and stems as well as yellowed and crinkled leaves were produced by inoculating sweet pea seed with the crown gall organism. No fasciation was caused in garden pea plants, though dwarfing occurred in some cases following inoculation.—Ontario Agricultural College, Guelph.

2068. BAKER, K. F. 635.936.832: 632.48
Fusarium wilt of garden stock (*Matioliola incana*).

Phytopathology, 1948, 38: 399-403, bibl. 7, illus.

An important wilt disease of garden stock and Ten Week stock was observed in California in September, 1946, caused by *Fusarium oxysporum* f. *matthiolii* n.f., which is commonly seed-borne. Since stocks require low temperatures for bud initiation and are grown in winter months, the disease may prove to be important only in the seed crop which continues growth through the summer.—University of California.

2069. BRIERLEY, P., AND SMITH, F. F. 585.84: 632.8
Canna mosaic in the United States.

Phytopathology, 1948, 38: 230-4, bibl. 3.

A mosaic disease of *Canna glauca* and of certain ornamental

varieties of *C. generalis* is considered the same as the mosaic of *Canna indica* previously reported from the Philippines. The popular red-flowered ornamental variety, The President, appears to be immune to this disease.—Agricultural Research Centre, Beltsville, Maryland.

2070. DAVATCHI, A. 632.752; 635.939.37
Saissetia oleae Bernard (Homoptera-Coccoidea).

[Iranian, French summary 1 p.]

Publ. trimestr. Dep. gen. Prot. Pl. Tehran No. 1, 1946, pp. 1-7.

The author records finding the olive black scale on oleander at the Ramsan agricultural station on the shores of the Caspian Sea, and describes the measures that are being taken to prevent its spread.

2071. DAVATCHI, A. 632.752; 635.939.37
A further note on *Saissetia oleae* Bern. [Iranian, French summary ½ p.]
Publ. trimestr. Dep. gen. Prot. Pl. Tehran No. 2, 1946, pp. 25-6.

It is stated that *Saissetia oleae* was introduced into Iran on young *Nerium oleander* plants imported from Russia by a Racht merchant in 1916, and since that time has become distributed into neighbouring regions by the sale of young plants.

2072. WÓYCICKI, S. 635.965.23
O mieszanych *Streptocarpus rexii* Lindl. × *S. polyanthus* Hook. (Hybrids of *Streptocarpus rexii* × *S. polyanthus*.) [English summary ½ p.] Reprint from the *Reports of Warsaw Scientific Society. Sect. IV of biological science*, 1947, 39, 40: 40-56.

Streptocarpus rexii and *S. polyanthus* can be crossed and the *F*₁ hybrids are fertile. In the *F*₁ generation the leaf characters of *S. rexii* and the flower structure of *S. polyanthus* are dominant, while the inflorescences, size of flowers and fruits are typically intermediate. The exceptionally prolific flowering of the hybrids may be regarded as generative heterosis.

2073. SMITH, W. W., AND FLETCHER, H. R. 635.939.183
The genus *Primula*: Section Vernalis Pax.

Trans. Proc. bot. Soc. Edinburgh, 1948, 34: 402-68.

An account of the species and varieties of *Primula* within the section Vernalis, with keys, and including notes on cultivated forms.

2074. BORG, Å. 635.939.183: 632.78
En skadeinsekt på primula. (A pest of primula.)
Växtskyddsnotiser, 1947, No. 4, pp. 62-4.

Larvae of the moth *Monochroa* (*Xystophora*) *farinosae* were found to cause damage to the leaves and flower buds of the cultivated *Primula veris*. DDT is recommended and reports of further incidence of the pest are invited.

2075. HALLEMANS, A. 635.938.59: 632.6/7
Enkele vijanden van cacteen en vetplanten.
(Pests of cacti and succulents.)
Cultuur Hand., 1948, 14: 33-5.

An illustrated account with notes on control measures. Nicotine preparations are recommended for scale insects, red spider, thrips, etc., and DDT for woodlice.

2076. POST, K. 635.937.17
Removing hydrangea leaves and hydrangea fundamentals.

Bull. N. York St. Flower Grs 25, 1947, pp. 1-3.

The forcing of hydrangeas is discussed. The ethylene given off by ripe apples serves to defoliate the plants in the first week of storage, thereby reducing the risk of rots; one bushel of apples is sufficient for 100 cu. ft. of storage, and four days is long enough to initiate leaf fall.

2077. SHERRIFF, G., AND TAYLOR, G. 635.967.4
The sacred lotus—*Nelumbo nucifera*.
J. roy. hort. Soc., 1948, 73: 216-17, bibl. 2, illus.
in colour.

The distribution, habitat, time of flowering, uses as food and medicine and the religious significance of this plant are briefly dealt with. The viability of its seeds exceeds that of any known species of flowering plant. Seeds estimated to be nearly 400 years old have been found viable.

2078. BLAUVELT, W. E., AND HOFFMAN, J. R. 632.951: 631.544
Parathion aerosol for greenhouse pest control.
Bull. N. York St. Flower Grs 29, 1948, pp. 1-6.

Applied as an aerosol in the greenhouse, parathion [diethyl *p*-nitrophenyl thiophosphate] is superior to HETP for controlling red spider mites on roses. It is highly effective against aphids, thrips, mealybugs, white fly, broad and cyclamen mites (on exposed plant surfaces) and many other pests. No serious injury was suffered by test plants, although normal leaf drop was increased on roses. Parathion is toxic to man, and safety measures must be elaborated before the parathion aerosol can be released for general use.—Cornell University.

2079. TUNBLAD, B. 631.544: 632.729
Ett bekämpningsförsök mot växthusgräshoppa.
(The control of the greenhouse cricket.)
Växtskyddsnotiser, 1947, No. 6, pp. 94-6.

An outbreak of greenhouse cricket, *Tachycines asynamorus*, developed in a begonia and in a chrysanthemum house. DDT remained ineffective, but a Chlordane ($C_{10}H_8Cl_2$) and a hexa-preparation achieved complete control two days after treatment.—Inst. for Plant Protection, Stockholm.

2080. SPOERL, E. 585.94: 631.184
Amino acids as sources of nitrogen for orchid embryos.
Amer. J. Bot., 1948, 35: 88-95, bibl. 17.

Arginine supported good growth of embryos from unripe orchid seeds; other amino-acids inhibited growth. Ammonium nitrate was equally effective as a source of nitrogen.—University of Arizona.

2081. BLAUVELT, W. E. 631.544: 632.944
Azobenzene developments.
Bull. N. York St. Flower Grs 19, 1947, pp. 1-9.

Describes the use of azobenzene as a fumigant in the ornamental greenhouse.—Cornell University.

2082. WELLENSIEK, S. J. 581.162.3: 635.939.183
Een kunstmatige bloembestuiver. (An artificial pollinator.)
Meded. Direct. Tuinb., 1948, 11: 101-4.

An electric pollinator made according to the specification of Cottrell-Dormer (H.A., 16: 926) has been constructed at the Wageningen Horticultural Laboratory and is here illustrated. A modification specially designed for cyclamen is described and illustrated. The original pattern has been used successfully in pollinating tomato and potato flowers.

2083. WÓYCICKI, S. 635.944: 631.8
Pobieranie składników pokarmowych przez tulipany. (The nutrient requirements of tulips.)
[English summary ½ p.]
Reprinted from the *Reports of the Warsaw Scientific Society, Sect. IV of biological science*, 1947, 39, 40: 56-63.

Tulips absorb nutritive elements chiefly in spring and early summer. In autumn the bulbs when planted produce roots and absorb only small amounts of these elements. In spring there is at first intensive absorption of nitrogen. The food requirements of tulips are greater than those of onion because tulips, during a relatively short vegetative period, absorb more nitrogen, rather less phosphorus and more potassium than onions, which have a growing period about twice as long. This indicates the necessity of giving tulips abundant mineral manures, especially nitrogenous, and of applying these in an easily assimilated form.

2084. WÓYCICKI, S. 635.935.722
Przyzcynek do znajomości przebiegu rozwoju pędzonych konwalii (*Convallaria majalis*). (The effect of early forcing on lily of the valley.)
[English summary ½ p.]
Reprinted from the *Reports of the Warsaw Scientific Society, Sect. IV of biological science*, 1947, 39, 40: 56-63.

In early forcing of lily of the valley at first only flowers develop; if the plants are left in a greenhouse at 15° C. the leaves appear after 2 to 3 months. Thus the flowers and leaves differ considerably in degree of dormancy, which is influenced by temperature. If the temperature during storage is low (0 to 5° C.) the flowers and leaves develop at the same time by late forcing. If the temperature during storage is too high (15 to 25° C.) the rhizomes do not develop at all.

2085. WADE, G. C. 635.944: 632.4
Gladiolus diseases.
Tasm. J. Agric., 1948, 19: 36-40, bibl. 3, illus.

The diseases described, with notes on control, are botrytis corm rot, hard rot (*Septoria gladioli*), dry rot (*Sclerotinia gladioli*), penicillium corm rot, bacterial scab and neck rot (*Bacterium marginatum*), and mosaic (caused by the cucumber mosaic virus).

2086. MAGIE, R. O. 635.944: 632.4
Curvularia spot, a new disease of gladiolus.
Plant Dis. Rept., 1948, 32: 11-13, bibl. 4.

Necrotic spots on gladiolus leaves, stems and florets are attributed to a fungus which is similar to or identical with *Curvularia lunata* (Wakker) Boedijn. The results of a preliminary spray test indicated that Dithane and Puratized Agricultural Spray, 2½ pints per 100 gal., were equally effective in preventing infection of the leaves.

2087. MCKNIGHT, T. 635.944: 632.3
Scab disease of gladiolus.
Qd agric. J., 1948, 66: 104-5.

Scab disease of gladiolus, caused by *Bacterium marginatum*, can be controlled by disinfecting corms in corrosive sub-limate solution (1 : 1,000) for 12 hours before planting, and by adopting a rotation including this crop not more often than once in four years.

2088. BIOLOGICAL BRANCH [N.S.W. DEP. AGRIC.]. 635.944: 632.4/8
Diseases of daffodils.
Agric. Gaz. N.S.W., 1948, 59: 83-6, illus.

Important diseases affecting daffodils in New South Wales are basal rot (*Fusarium bulbigenum*), bulb eelworm or nematode disease (*Anguillulina dipsaci*), and a virus disease (stripe or grey disease). These, and also leaf scorch (*Stagonospora curtisi*, recently recorded in New South Wales) are described and treatments recommended.

2089. (MINISTRY OF AGRICULTURE.) 632.77: 635.944
Narcissus flies.
Adv. Leafl. Minist. Agric. Lond. 183, 1948, 3 pp., illus.

The habits, hosts and damage caused by the large narcissus fly (*Merodon equestris* Fab.) and the small bulb flies (*Eumerus strigatus* Fall. and *E. tuberculatus* Rond.) are outlined. Preventive and control measures include thorough cultivation of the surface soil, hot water treatment and the application of insecticidal dusts containing either 666 or DDT.

2090. TUNBLAD, B. 635.944: 632.4
Ett bekämpningsförsök mot mjöldagg på begonia.
(The control of mildew in begonia.)
Växtskyddsnotiser, 1947, No. 2, pp. 24-7.

The dominant position of sulphur for the control of mildew

FLORICULTURE—SUB-TROPICAL CROPS

in glasshouses has been recently challenged by emulsions of so-called white oils which may be mixed with insecticides. Of the 5 preparations tested F.D. White Oil (Ultramare) was 100% effective at the lowest concentration, viz. 1%. No spray injury occurred. Observations suggest that the white oils used do not kill the fungus chemically but suffocate it physically. Where the fungus succeeds in piercing the skin formed by the oil, the treatment must be repeated. The oils, therefore, have no chemical protective value. It is possible that the superiority of F.D. White Oil over other oils is due to its constituent, tetramethylthiuramdisulphide.—Institute for Plant Protection, Stockholm.

2091. HOLMES, F. O. 635.944: 632.8
Elimination of spotted wilt from a stock of dahlia.
 Abstr. in *Phytopathology*, 1948, 38: 314.

It was concluded that a stock of Rhythm dahlia has been freed from virus by radical removal of diseased tissues, i.e. old roots, stems, and lower leaves.

2092. THOMAS, G. S. 635.937.34
Shrub roses for the modern garden.

J. roy. hort. Soc., 1948, 73: 170-80, illus.

While he welcomes the introduction of new roses, the writer pleads for a wider use of those cultivated in Europe before the advent of the China rose and the Tea rose. These older roses are charmingly described and their strong points emphasized. A comprehensive collection is desirable, as many varieties are in danger of extinction in old neglected gardens. Plates are taken from Redouté's *Les Roses*, and from Miss Willmott's *Genus Rosa*.

2093. STREETS, R. B. 635.937.34: 632
Control of Arizona rose diseases.

Bull. Ariz. agric. Exp. Stat. 213, 1948; pp. 32, illus.

The bulletin starts with a key for the identification of maladies of Arizona roses, and then proceeds to describe diseases of major importance, others rare or not known in Arizona, foliage defects, blossom blights, and other causes of failure. There are 6 plates.

2094. ELLIS, D. E., AND CLAYTON, C. N. 635.937.34: 632.4
Mycosphaerella rosigena on greenhouse roses.

Plant Dis. Repr., 1948, 32: 9-10.

Leaf lesions on roses in commercial greenhouses in N. Carolina bore small perithecia of a fungus morphologically

indistinguishable from *Mycosphaerella rosigena*. The spots in great numbers were associated with yellowing and abscission of affected leaflets and leaves.

2095. HAFLIGER, E. 635.976.4
Comment soigner les lauriers ? (The care of the laurel.)
Rev. hort. suisse, 1948, 21: 135-7.

The laurel, *Laurus nobilis*, needs careful watering during the winter; sudden changes in its environment should be avoided. The laurel psyllid, *Trioza alacris*, can be controlled by spraying laurels in winter or spring, before eggs are produced: a DDT preparation, Gésafid, is recommended. It may be advisable to repeat this treatment after the summer pruning to protect the new growth.

2096. WOLF, F. A. 635.976.33: 632.4
Twig blight of golden bell, *Forsythia viridissima* Lindl.

Plant Dis. Repr., 1947, 31: 325.

This disease is caused by *Sclerotinia sclerotiorum* which appears to enter the twigs by first causing a blossom blight.

2097. LOUNSKY, J. 632.944: 635.939.124
La désinfestation des plantes horticoles terrestres et plus particulièrement des azalées. (The disinfection of balled nursery stock, particularly azaleas.) [Summaries of 10 l. in Dutch, English and German.]
Bull. Inst. Agron. Gembloux, 1945, 14: 32-53, bibl. 28, illus.

Fumigation with methyl bromide in a vacuum destroys soil pests. [This paper appeared in Dutch in *Parasitica*, 1945, 1: 113-31; *H.A.*, 17: 1618.]

2098. WISTER, J. C. 635.936.751
Hybrid yellow tree peonies.

J. roy. hort. Soc., 1948, 73: 190-2.

An account of several attractive hybrids of *Paeonia lutea* and *P. delavayi* with *P. moutan* now being distributed in the United States.

2099. a HUNKIN, J. W. 581.9(423.7)
Some notable plants in Cornish gardens.
J. roy. hort. Soc., 1948, 73: 201-10, illus.

b CORRELL, D. S. 585.94(73)
Some revisions of American orchids.
Lloydia, 1947, 10: 209-28.

SUB-TROPICAL CROPS.

General.

(See also 1553-1556, 1593, 2323, 2333.)

2100. FRENCH, O. 634.3
Rotational horticulture is essential to permanency in the [citrus] industry.
Agric. Gaz. N.S.W., 1948, 59: 69-72, 133-8, bibl. 2.

The author deals with methods of preventing soil degeneration during the life of trees (citrus), with particular reference to the Murrumbidgee Irrigation Area, and discusses rotational horticulture in which the land is regenerated before replanting. He envisages a 30-year cycle made up as follows: (1) Ten years of low, although increasing, production during the establishment period; (2) Ten years of high production with mature trees at full productivity; (3) Five years of declining production as the trees become senile, and (4) Five years of regeneration. Variations of this plan are discussed. A suggested planting programme to establish a rotation is set out.

2101. MCKEE, R., AND McNAIR, A. D. 631.874
Winter legumes for green manure in the Cotton Belt.
Fmnrs' Bull. U.S. Dep. Agric. 1663, revised 1948, pp. 22, illus.

Sweet potatoes are included amongst the crops that may follow winter legumes. Useful notes are given on 23 green-manure plants adapted to the Cotton Belt of the U.S.A.

2102. TAGHI-ZADEH, F. 632.951
Trials with DDT as an insecticide. [Iranian, French summary 5 pp.]
Publ. trimestr. Dep. gen. Prot. Pl. Tehran No. 4, 1947, pp. 58-66.

Trials carried out in Iran with DDT gave favourable results in the control of pistachio pests (particularly *Idiocerus stali*) and citrus scale insects (particularly *Chrysomphalus dictyospermi*). On pistachio it was found that DDT killed a large number of both destructive and useful insects, and a list is given of 18 species which were collected under a tree an

hour after the application of a DDT emulsion and died in $\frac{1}{2}$ to 120 hours, mostly 2 to 5 hours later. On citrus the only fault of DDT emulsions is said to be the high mortality of parasites such as *Aphytis chrysomphali*.

Citrus.

(See also 1577, 1857.)

2103. SCHWOB, R. 668.526.42(457/8)
La production des essences de citrus en Italie méridionale. (The production of essential oils in southern Italy.)
Fruits d'Outre-Mer, 1948, 3: 84-92.
An account of the areas of production of lemon oil, bergamot oil, neroli and other citrus oils. Italy has a world monopoly of bergamot, which is grown, solely for its oil, in a small area of Calabria near the Straits of Messina. Most of the Italian lemon crop comes from Sicily, but only a small proportion is used for oil production.

2104. MATTHEW, A. 634.3(759)
The Florida citrus industry.
Citrus Gr., 1947-48, No. 162, pp. 1-4; 164, pp. 9-11; 165, p. 7; 166, pp. 10-12; 167, pp. 1-3; 168, p. 12, bibl. 14.
A report based on a recent visit to Florida where 40% of the annual citrus crop of 90 million boxes is processed, a development which must eventually influence the world fresh fruit market.

2105. LA PORTE, J. 634.323
Floración precoz en pomelos. (Precocious flowering of grapefruit.)
Cienc. Invest., 1948, 4: 215-16, bibl. 3, illus.
Of 32 grapefruit seedlings, 12 produced normal flowers in September at the age of 4 months.—Facultad de Agronomía y Veterinaria, Buenos Aires.

2106. HEUNIS, A. J. 634.3
Contour planting of citrus orchards. [English and Afrikaans.]
Citrus Gr., 1948, No. 168, 1-6, bibl. 2, illus.
With the expansion of the citrus industry in S. Africa level land for growing citrus under irrigation is increasingly difficult to obtain, so that growers are beginning to utilize slopes. Four types of contour planting suitable for sloping land are described. Hints are given on layout and irrigation practice.

2107. CHATTERJEE, D. 634.323
Botanical nomenclature of the shaddock or pomelo.
Nature, 1948, 161: 770, bibl. 4.
The correct botanical name for shaddock is neither *Citrus decumana* Linn., as it is usually called, nor *C. grandis* Osbeck, as suggested by Swingle, nor any of the other synonyms cited, but *C. maxima* (Burm.) Merrill.—Royal Botanic Gardens, Kew.

2108. GOUDIE, A. G. 634.3-1.67
Systems of irrigation for citrus in the Mildura area [Victoria].
J. Dep. Agric. Vict., 1948, 46: 69-72.
Irrigation for citrus is discussed under (1) permanent installation, (2) portable installation requiring frequent shifting of sprinklers, (3) equipment requiring occasional shifting. Spray systems are specially suited to light, undulating soil, but not normally for heavy land because the rate of absorption is too slow for the delivery rate of most systems. Flat-grade, furrow-irrigation requires no expensive plant and equipment, and, if properly carried out, can be very efficient, but the land must be accurately graded, and the furrows large and well formed. Continuous patrolling is necessary.

2109. EVERETT, P. 634.3-1.67
Irrigation of citrus orchards in Kerikeri.
N.Z. J. Agric., 1948, 76: 161-2.
Equipment for irrigation has been installed in 26 citrus orchards at Kerikeri with encouraging results; this article, a guide to irrigators in that locality, may be useful also to others. All irrigators are asked to keep records of the dates of irrigation, the quantities applied per tree, and the area irrigated, so that data can be collected and used as a guide for future operations.

2110. VAN LAERE, R. 634.3-1.541.11
De l'influence des sujets porte-greffes en agrumiculture. (Citrus rootstocks.)
C.R. Semaine agric. Yangambi, 1947, pp. 413-16, being *Commun.* 24.
An account of irrigated citrus variety and rootstock trials, established in 1938 and 1942 on different soil types at the I.N.E.A.C. Fruit Station, Vuazi, Bas Congo. Early data are given from a trial of oranges, mandarins and grapefruit on sour orange and rough lemon. Other stocks are being used experimentally, the relative success of grafts with various combinations of stock and scion being recorded.

2111. HAAS, A. R. C. 634.3-1.541.11
Effect of the rootstock on the composition of citrus trees and fruits.
Plant Physiol., 1948, 23: 309-30, bibl. 12.
Numerous data are given, showing that the rootstock may have a very considerable effect on the chemical composition of trees of Washington Navel orange, Valencia orange, Marsh grapefruit, and Eureka lemons. In some cases trees on their own roots were also available. The importance of the rootstock in comparative studies is emphasized.—Riverside, Calif.

2112. HOFMEYR, J. D. J., AND OBERHOLZER, P. C. J. 634.3-1.521
Genetic aspects associated with the propagation of citrus.
Fmg S. Afr., 1948, 23: 201-8, bibl. 9.
Emphasis is placed on the dangers of accumulating certain degenerative diseases as a result of vegetative propagation. Nucellar embryony may be employed to purify plant material from viruses, without sacrificing its genetic constitution. The greater vigour of plants of nucellar origin is probably largely due to the elimination of viruses. Crossing offers only limited possibilities as a method of improving citrus varieties. Bud variation occurs with high frequency, and can sometimes be used advantageously. The chimera condition of variant tissue presents difficulties in propagating bud variants in pure form. Under certain conditions, nucellar embryony might be employed as a purifying process to separate tissues of different genetic constitution. Despite certain unfavourable characteristics, nucellar plant material possesses certain advantages. The three citricultural problems mentioned in this article appear to be related, i.e. incompatibility between certain species of citrus and the sour orange rootstock is caused by a virus; there is strong indication that "stem pitting" of grapefruit may also be caused by a virus, probably related to psoriasis; the suggestion is put forward that a virus is associated with the "greening disease" of sweet orange and naartjie. Although the incompatibility problem is at present of no practical importance in South Africa, "stem pitting" and "greening" are of great economic importance. The co-operation of citrus growers and others is invited in the search for resistant material and bud variants. [From authors' summary.]—Agric. Res. Inst. Pretoria.

2113. RANDHAWA, G. S., AND DINSA, H. S. 634.3: 581.145
Time of blossom-bud differentiation in citrus.
Proc. Amer. Soc. hort. Sci., 1947, 50: 165-71, bibl. 7, illus.
A record of a study carried out with sweet orange and

sweet lime at Lyallpur, India. Blossom-bud differentiation in both sweet orange and sweet lime began in spring with advent of growth. In sweet orange, more buds differentiated of the early flushes than of the late flushes. In sweet lime, no such distinction was observed. In sweet orange, terminal buds differentiated in greater degree than lateral buds. This was not so in sweet lime. [From authors' summary.]—Univ. of the Punjab.

2114. RANDHAWA, G. S., AND DINSA, H. S.

634.3: 581.14

Relation of growth to fruiting in citrus.

Proc. Amer. Soc. hort. Sci., 1947, 50: 151-60, bibl. 7.

Studies on Valencia Late oranges at Lyallpur, India, are reported from which the following, among other, conclusions are derived. "Flowering bore a definite relation to extension growth. Correlation between leaf area and blossoming was highly suggestive. Young trees grew more vigorously than mature trees. Terminal shoots produced more extension growth and leaf area than the lateral shoots. Early growth flushes were more productive than late flushes. There was no relation between growth and fruit setting. The individual shoots of Valencia Late variety had a strong tendency to alternate bearing. The mean length, mean number of nodes, and mean leaf area per shoot were greater in flowering than in non-flowering shoots. Leaf area per centimeter shoot length and internodal length bore no relation to flowering. In mature trees flowering shoots had bigger leaves than non-flowering shoots. The March flush produced more laterals than other flushes. Terminal shoots produced more laterals than lateral shoots. The growth in Valencia oranges took place from April to January. There was no further size increase after January."—Univ. of the Punjab.

2115. RANDHAWA, G. S., AND DINSA, H. S.

634.31: 581.14

Quality of Valencia oranges as affected by aspect, exposure, and height on the tree.

Proc. Amer. Soc. hort. Sci., 1947, 50: 161-4.

The results of a study carried out at Lyallpur, India, are reported. The data reveal that exposed fruits on the tree were thin-skinned with a higher total-solids/acid ratio. Shaded fruits were heavier than the exposed ones. The fruit of the upper half was heavier and with a higher total-solids/acid ratio than fruit of the lower half, whereas fruit of the lower half ranked higher in percentage of juice. The investigation also indicates that heat does not reduce the quality of Valencia oranges but rather improves it in many respects. [From authors' summary.]—Ontario Agric. College.

2116. SINCLAIR, W. B., AND BARTHolemew, E. T.

634.31: 581.192

Compositional factors affecting the edible quality of oranges.

Proc. Amer. Soc. hort. Sci., 1947, 50: 177-86, bibl. 17, being Pap. 565, Univ. Calif. Citrus Exp. Stat.

The authors report a 7-year investigation in California with Valencia and Washington Navel oranges, mostly on trifoliolate and rough lemon stocks, the problem being "to correlate data on total soluble solids, pH, and total acidity of orange fruits with data published by other investigators on the taste and flavour of fruits. Attention is drawn to certain chemical changes that occur in the fruit and produce changes in these constituents of the juice. The soluble constituents other than sugars and acids are discussed in relation to taste of the fruit."—Univ. of Calif. Cit. Exp. Stat.

2117. HERRERO DE EGAÑA, M., AND ACERETE LAVILLA, A.

634.31-1.547.6

Pruebas de madurez de las naranjas. (Testing the ripeness of oranges.)

Bol. Inst. nac. Invest. agron. for. Madr., 1947, No. 16, pp. 211-43, bibl. 33.

The importance of maturity tests in the inspection of oranges for export is indicated and the chief tests used in various countries are described. The most important tests are the relations sugar/acid of the juice, soluble solids/acid, the degree Brix/acid, and the acidity. Acidity, as a single test, is considered sufficient, and the method adopted at the Estación Naranjera de Levante (Burjasot, Valencia) is described. The conclusion drawn is that palatable oranges contain not more than 27 g. of citric acid per litre of juice.

2118. CASTAGNOL, L. M.

634.3: 581.192

Étude chimique des agrumes du nord de l'Indochine. (The composition of citrus fruits in northern Indochina.)

Fruits d'Outre-Mer, 1948, 3: 57-62.

Introduced commercial varieties are generally of greater value than local forms, of which only two are of possible value. Local varieties are, however, useful for the extraction of citric acid or pectin.

2119. JONES, W. W., AND PARKER, E. R.

634.31-1.8: 577.16

Ascorbic acid-nitrogen relations in Navel orange juice, as affected by fertilizer applications.

Proc. Amer. Soc. hort. Sci., 1947, 50: 195-8, bibl. 7, being Pap. 571 Univ. Calif. Citrus Exp. Stat.

Under the conditions of this study, there was an over-all inverse correlation between nitrogen and ascorbic acid in the juice of navel oranges. The amount of nitrogen in the juice varied with the amount applied in the fertilizer. The addition of organic matter to those fertilizer treatments providing equal amounts of nitrogen per tree annually resulted in a highly significant decrease in nitrogen in the juice but had no effect on the ascorbic acid content. [Authors' summary.]

2120. MIÈGE, —.

634.322: 577.17

Essai de traitement aux hormones synthétiques contre la chute prématûrée des fruits de Clémentiniers. (A hormone trial against preharvest drop of fruit of the Clementine orange.)

C.R. Acad. Agric. Fr., 1948, 34: 302-6.

The results of the trial described show that applications of potassium naphthylacetate reduced preharvest drop, the average yield from the treated trees being about 3½ times (7½ times on some trees) that from trees untreated.

2121. STEWART, W. S., AND PARKER, E. R.

634.323: 577.17

Preliminary studies on the effects of 2,4-D sprays on preharvest drop, yield, and quality of grapefruit.

Proc. Amer. Soc. hort. Sci., 1947, 50: 187-94, bibl. 3, illus., being Pap. 570, Univ. Calif. Citrus Exp. Stat.

The indications from these studies are that water sprays containing between 5 and 25 parts per million 2,4-D are promising as treatments for the reduction of preharvest drop of grapefruit. Sprays containing 5 p.p.m. 2,4-D were almost as effective as those containing 25 p.p.m. [From authors' summary.]—Univ. Calif. Citr. Exp. Stat.

2122. HERRERO DE EGAÑA, M.

634.31-1.8

Preparación de una experiencia sobre fertilizantes nitrogenados, en el abonado del naranjo. (Preparing a nitrogenous fertilizer trial for oranges.)

Bol. Inst. nac. Invest. agron. for. Madr., 1947, No. 16, pp. 189-210, bibl. 16, illus.

Details are given of a field trial with Washington Navel orange budded on sour orange (*Citrus aurantium*), at the Estación Naranjera de Levante (Burjasot, Valencia), with particular reference to the lay-out of plots and the methods adopted to obtain uniform planting material.

2123. HARDING, P. L., WINSTON, J. R., AND FISHER, D. F. 634.31(759)
Seasonal changes in Florida oranges.
Tech. Bull. U.S. Dep. Agric. 753, 1940, pp. 89, bibl. 30, illus. [received 1948].

Changes in the following characters were followed: weight and diameter of fruit, colour of rind and flesh, thickness of rind, flavour, ascorbic acid content, buffer capacity, pH value, total acids, total solids, sucrose, and reducing sugars. The investigation covered three seasons and involved several varieties of orange grown on various rootstocks in different parts of the state. When this investigation was conducted, 1935-38, the Florida Citrus Maturity Law defined ripe oranges as those with a ratio of total soluble solids to citric acid in the juice not less than 8 : 1. It is shown that this definition is quite insufficient, and it is suggested that fruit of good eating quality could be defined by setting a minimum total solids content and a maximum as well as a minimum total acid content.

2124. ELZE, D. L. 634.31: 581.14
A growth study of the Jaffa orange.
Bull. agric. Res. Stat. Rehovot 45, 1947, pp. 27-42, bibl. 24.

Some growth studies of plant parts are reviewed, special attention being given to Reed's mathematical considerations concerning shoot growth of fruit trees. "The literature on the growth of stone fruits is reviewed at some length, as well as measurements of apple, pear, and lemon which have been undertaken in connexion with irrigation experiments." "It was found that the growth in circumference of the Shamouti [Jaffa] orange suits a logarithmic curve, whereas the growth curve for volume proved to be rather of a sigmoid type." It is shown that oranges in Palestine continue to grow in winter, even during the coldest months, January and February.—*Agric. Res. Stat., Rehovot, Palestine.*

2125. BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, U.S.A. 632.97: 634.3
Quarantine notices.
U.S. Department of Agriculture, B.E.P.Q.—Q19, Q.28 and Q.75, 1947.

The U.S. Department of Agriculture has recently issued three quarantine notices with reference to citrus canker (*Xanthomonas citri*). Nos. 19 and 28 are to provide protection against the entry into the United States of rutaceous plants from countries where citrus canker is known to occur. No. 79 is to prevent the spread of citrus canker from Hawaii to the mainland of the United States.

2126. LEMAISTRE, J. 634.3-2.8
La maladie "tristeza" des agrumes. (The tristeza disease of citrus.)
Fruits d'Outre-Mer, 1948, 3: 133-9, bibl. 23, illus.

A review of research on tristeza, quick decline, or podredumbre de las raízillas. The author pleads for immediate research in the French Union to discover rootstocks to replace sour orange, against the probability that the disease will eventually appear in territories where it has not yet been observed.

2127. MUNGER, F. 632.752: 634.3
Reproduction and mortality of California red scales resistant and non-resistant to hydrocyanic acid gas, as affected by temperature.
J. agric. Res., 1948, 76: 153-63, bibl. 11.

Resistant and non-resistant strains of the California red scale (*Aonidiella aurantii*) of citrus were subjected to a range of temperatures from low temperatures which killed nearly all the moulting stages, to temperatures high enough to injure the host fruit. No consistent differences between the reactions of the two strains were noted. At certain times scales of one strain were more tolerant to adverse temperatures than those of the other strain, but such differences might be reversed in a later generation. In the laboratory a temperature of 121.5° caused death in some stages of the life history, but in nature relatively few scales are exposed to so high a temperature.

2128. ESFANDIARI, E. 632.752: 632.96
***Fusarium jruuanum* P. Henn. on the red scale (*Chrysomphalus dictyospermi* Morg.) in northern Iran.** [Iranian, French summary 1 p.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 1, 1946, pp. 25-7.

Fusarium jruuanum has been found to be parasitic on the citrus red scale, a serious pest in northern Iran not only of *Citrus* spp. but also of a number of other fruit trees and of ornamentals. The biological control of the red scale by the fungus in Iran is possible only in the very humid regions.

2129. KIRIUKHIN, G. 632.752: 632.96
The parasites of *Chrysomphalus dictyospermi* Morg. in northern Iran. [Iranian, French summary 3 pp.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 2, 1946, pp. 13-22.

Three parasites of the citrus red scale are described, viz. *Aphytis chrysomphali* Mercet. var. nov. *Mazandaranica* Ki., *Prospaltella fasciata* Molen. and *Fusarium jruuanum* P. Henn. The two insect parasites are illustrated.

2130. KIRIUKHIN, G.
***Prospaltella* sp. (Hym. Chalcidae-Aphelinidae) parasite of *Lepidosaphes beckii*.** [Iranian, French summary 2 pp.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 3, 1947, pp. 16-18, bibl. 2.

A species of *Prospaltella* has been found parasitizing the purple citrus scale, *Lepidosaphes beckii* (95%), *Aonidiella citrina* (80%), and also *Hemiberlesia camelliae* on *Buxus*. It is described and illustrated.

2131. KIRIUKHIN, G., AND TAGHI-ZADEH, F. 632.752
***Pulvinaria aurantii* Ckll.** [Iranian, French summary ½ p.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 2, 1946, pp. 27-8.

In the subtropical regions of northern Iran, the scale insect *Pulvinaria floccifera* Westw. is found in abundance attacking citrus while *P. aurantii* was found for the first time in 1946. Fortunately the climate is unsavourable for *P. aurantii* which, moreover, is attacked by the fungus *Cephalosporium lecanii* Zimm. The morphological characters of these two scale insects are illustrated.

2132. KAUSSARI, M. 634.3-2.7
Citrus pests on the shores of the Caspian Sea. [Iranian, French summary 1 ½ pp.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 1, 1946, pp. 32-8, bibl. 2.

Eleven citrus pests are described and one of them, *Iceria purchasi* Mask., is illustrated. This scale insect was observed for the first time in Iran in 1928, and in 1931 it was causing extensive damage in orange plantations there.

2133. KARLING, J. S. 632.752: 632.96
Chytridiosis of scale insects.
Amer. J. Bot., 1948, 35: 246-54, bibl. 16, illus.

A chytrid, *Myiophagus ucrainicus*, infects scale insects, *Lepidosaphes* spp., which attack citrus and Bermuda cedar. On orange twigs up to 45% of the females of *L. beckii* may be thus killed.—Columbia University, New York.

2134. KIRIUKHIN, G., AND TAGHI-ZADEH, F. 632.752: 634.3
The coccids of the genus *Aonidiella* in the subtropical regions of northern Iran. [Iranian, French summary ½ p.]
Publ. trimest. Dep. gen. Prot. Pl. Tehran No. 3, 1947, pp. 40-3, bibl. 3.

Illustrated descriptions of two citrus scale insects found in

SUB-TROPICAL CROPS

northern Iran, viz. *Aonidiella aurantii* Mask. and *A. citrina* Coq., and a comparison with *Chrysomphalus dictyospermi* Morg.

2135. HELY, P. C. 634.3-2.76
 Fuller's rose weevil (*Pantomorus (Asynonychus) godmani* Crotch)—a troublesome pest of citrus trees.
Agric. Gaz. N.S.W., 1948, 59: 144-8, bibl. 6.

Fuller's rose weevil, first recorded in New South Wales in 1934, has spread into many citrus orchards over a large area of the central coast. The weevil and its life history are described. It has many host plants. In New South Wales it attacks all varieties of citrus, peach, rose, plum and a number of weeds and ornamentals. On citrus and similar fibrous-leaved plants it chews out large pieces round the margins of the leaves, giving them a ragged, saw-toothed appearance (illustrated). The larvae bite off and destroy the fibrous roots. Control measures include clean cultivation to keep down the weed hosts, spraying with cryolite (1½ lb. to 40 gal.) or DDT emulsions. To be effective, sprays must be applied when weevils are first observed damaging trees, which is usually in late December or early January [in N.S.W.].

Avocado.

2136. SCHROEDER, C. A. 634.653(72)
 The [avocado] expedition to Mexico of May 1947.
Yearb. Calif. Avocado Soc. 1947, pp. 29-33, illus.
 POPENOE, W., AND WILLIAMS, L. O.
 The expedition to Mexico of October 1947.
ibid., pp. 22-8, illus.

Various aspects of the variety problem are discussed viewed in the light of past experience and the knowledge gained from these expeditions sponsored by the Committee of Foreign Exploration of the Calif. Avocado Soc. [The purposes of this committee are: to sponsor expeditions to find primitive avocados and related forms in Mexico and Central America, to introduce these into California for study, to test them as rootstocks—particularly for resistance to "decline", and to introduce avocado varieties of possible commercial value. *Ibid.*, p. 123.]

2137. ANON. 634.653-1.523
 Report of the Variety Committee on Avocados, California Avocado Society, June 21, 1947.
Yearb. Calif. Avocado Soc. 1947, pp. 12-14, 18-21.

The following varieties are recommended for commercial planting in certain named areas in Southern California: Fuerte, Hass, Nabal, MacArthur and Anaheim. A list is given of 116 named seedling varieties (some of them briefly described) which have been registered with the Society.

2138. RICHARDS, A. V. 634.653(548.7)
 The performance of some imported varieties of avocado in Ceylon.
Trop. Agriculturist, 1948, 103: 20-5, bibl. 5.

Includes a progress report on preliminary trials (randomized block, single-tree plots) at Peradeniya of the varieties: Gottfried, Puebla, Pollock and St. Anne, budded (1941) on seedlings of the local West Indian avocados. The varieties ripen their fruit in the order: Gottfried (in May), followed by Pueblo, Pollock and St. Anne—a late variety maturing August-September. It is too soon to report on yields.

2139. ROUNDS, M. B. 634.653
 Starting an avocado orchard.
Yearb. Calif. Avocado Soc. 1947, pp. 57-9.

Practical advice on selection of site, preparation of land, planting, irrigation, manuring, protection and cultivation.

2140. LAI-YUNG LI AND WOODHEAD, C. E. 634.653(931)
 A note on avocado culture in New Zealand.
Yearb. Calif. Avocado Soc. 1947, pp. 108-11, bibl. 7, illus.

Named avocado varieties were first planted in New Zealand in 1919. A short note on climate and soil in the Auckland Province precedes tables showing: occurrence of frosts, rainfall data, chemical analysis of an Auckland soil, and a list of avocado varieties grown in different localities.

2141. HODGSON, R. W. 634.653-1.55
 Bearing habits of the avocado.
Yearb. Calif. Avocado Soc. 1947, pp. 35-9.

A talk on alternate bearing. It is concluded that the solution of this problem lies in plant selection and breeding.

2142. MARSH, R. H. 634.653-1.67
 Irrigation of young and old avocado orchards.
Yearb. Calif. Avocado Soc. 1947, pp. 80-4.

Water should only be applied when the soil in the upper two-thirds of the rooting region has become relatively dry, as determined by a soil auger or soil tube. Sprinkler, furrow and basin irrigation methods are described, the first being the most common. Water requirements of mature avocado trees vary from 8 to 23 in. per acre per annum (=29,000 to 83,500 cu. ft. approx.).

2143. FRANCE, J. G. 634.653-1.542
 Practical points in avocado pruning.
Yearb. Calif. Avocado Soc. 1947, pp. 89-91.

"There appears to be no scientific basis for the pruning of avocado trees" . . . but lack of pruning and tree thinning will eventually cut down the possible yield materially. A well-pruned orchard is accessible for cultivation, weeding, irrigation, manuring, pest and disease control and harvesting. Stress is laid on the need for shaping the trees when young, particularly those of the Fuerte variety. Advice is given on this and on annual pruning.

2144. BECK, W. R. 634.653-1.537
 Quick propagation of avocado nursery.
Yearb. Calif. Avocado Soc. 1947, pp. 74-6, illus.

A description of a method whereby grafted avocado plants, ready for planting in the field, can be produced in 7-9 months. Seed of a good Mexican tree is planted in autumn in building-felt cylinders (5 in. diameter × 12 in. high) containing a mixture of two-thirds loam, one-sixth peat moss and one-sixth ground dairy manure. The seedlings, which are raised in a hot-house, are ready for grafting when about 4 months old. The graft and the transfer to the field are described.

2145. CINTRON, R. H. 634.653-1.55
 Fruit setting and fruit development of avocados in Texas.
Yearb. Calif. Avocado Soc. 1947, pp. 62-6.

Excessive fruit-drop is reported in certain varieties and low oil-content in all varieties. It appears that in general high oil-content is a response to low mean temperatures during fruit development rather than a specific varietal characteristic.

2146. HAAS, A. R. C. 634.653-1.84
 Nitrogen effects on avocado seedlings in soil cultures.
Yearb. Calif. Avocado Soc. 1947, pp. 51-4, bibl. 1.

Figures are given showing (1) growth measurements (stem circumference and height, weight of leaves, trunk and roots) and (2) the chemical composition of leaves, petioles and rootlets of avocado seedlings in soil cultures maintained at various concentrations of nitrate nitrogen from 25 to 550 p.p.m. NO₃.

2147. HAAS, A. R. C. 634.653: 551.577
Rainfall distribution under Fuerte avocado trees.
Yearb. Calif. Avocado Soc. 1947, pp. 47-50, illus.
An account of an investigation on two Fuerte avocado trees. Experimental methods are described and illustrated. It was found that a considerable quantity of water moved down the trunk under certain conditions and it is suggested that this may continue down the roots, removing or displacing oxygen and other "nutritive constituents . . . and may be followed by root-rot and tree decline". The drip area under a tree depends on shape of branches, intensity of rainfall, uniformity of canopy and wind. The water collected at the periphery of the trees ("drip") was less than that collected in the open. The method of applying fertilizers to avocados may need to be modified in view of this finding.

2148. ZENTMYER, G. A., AND KLOTZ, L. J. 634.653-2.4
The cinnamon fungus and avocado decline.
Yearb. Calif. Avocado Soc. 1947, pp. 40-2, bibl. 3.
"Avocado decline" is defined as a disease "occurring primarily on soils that tend to stay wet for varying periods, and with which . . . *Phytophthora cinnamomi* is practically always associated". The term "avocado root rot" is suggested as being more appropriate. Experiments in replanting diseased orchards and the treatment of diseased trees are discussed.

2149. EBELING, W., AND PENCE, R. J. 634.653-2.752
The mealybug problem on newly top-grafted avocado trees.
Yearb. Calif. Avocado Soc. 1947, pp. 44-5, reprinted from *Calif. Agric.*
A dust containing 10% DDT applied to newly-grafted avocado stumps is claimed to have given a high degree of control over long-tailed mealybugs [species not named].

Tung oil.

2150. HANSEN, P. L., AND MIGHELL, R. L. 633.85
Oil crops in American farming.
Tech. Bull. U.S. Dep. Agric. 940, 1947, pp. 55, bibl. 28.
Includes a note on the present, small-scale, U.S.A. production of tung and olive oils and an estimate of their production in 1955.

2151. MAAS, J. A. 633.85
De cultuur van *Aleurites*. (The cultivation of tung.)
Landbouwk. Tijdschr., 1948, 60: 194-203.
A shortened review of tung literature with reference to world trade, botany, diseases, cultivation and selection. A comprehensive review of the literature is available at the Afdeling Tropische Landbouwplantenteelt, Landbouwhogeschool, Wageningen.

2152. SALTER, R. M. 631.55: 633.85 + 634.58
Progress in improving tung nut and peanut machines.
Report of the Administrator of Agricultural Research 1947, *Bur. Pl. Industry, Soils, and agric. Engng.*, U.S.D.A., Wash., 1948, pp. 337, 338, 60 cents.
A description is given of an experimental, tractor-drawn, harvester fitted with a flexible spring-tooth rake for picking up the fruits, which are thrown up a flexible incline of round rods into a conveyor and moved to an elevator along one side. The machine is capable of gathering tung nuts at the rate of one acre per hour under favourable conditions. Reference is made to a test of the U.S.D.A. field huller for tung nuts which, mounted on a trailer and equipped with an engine, hulled whole fruit at the rate of 1,690 lb.

per hour. Drying and conditioning tests of field-hulled nuts showed that they could be dried in a bin to the safe point by circulating air through them, by fan, at atmospheric temperature.

2153. DROSDOFF, M., FISHER, E. G., AND LASSITER, J. H. 633.85
Effect of frequency and method of cultivation on the growth of one-year-old tung trees.
Proc. Amer. Soc. hort. Sci., 1947, 50: 115-18, bibl. 1.
An account of 2 experiments (7 and 9 treatments) in Florida. The results indicate that the beneficial effect of cultivation on tree growth was due primarily to keeping the area around the trees free of weeds. Whether or not the soil was stirred was unimportant. Mulching was as effective as hoeing or spading.—U.S.D.A., Gainesville, Fla.

2154. HOWARD, L. B. 633.85: 581.192
Rapid analytical methods developed for tung oil mills.
Report of the Administrator of Agricultural Research 1947, *Bur. agric. industr. Chem.*, U.S.D.A., Wash., 1948, pp. 53, 54, 60 cents.
A short note on methods devised for sampling truck loads of tung nuts and determining the oil and moisture in subsamples. "These include a method based simply upon an estimate of the percentage by weight of kernels in the sample and an assumed oil content of kernels, since oil content has been found to be fairly constant for any given area throughout each season; also a method based upon determination of the refractive index of the solution obtained when a certain weight of a particular solvent is allowed to come to equilibrium with a definite weight of the finely ground sample of tung nuts. In the longer extraction procedure intended for more accurate oil determinations, drying of the subsample is essential, even if double extraction is employed."

2155. DROSDOFF, M., AND NEARPASS, D. C. 633.85-2.19
Quick tests for potassium and magnesium in tung leaves and difference in composition of different parts of the petiole.
Proc. Amer. Soc. hort. Sci., 1947, 50: 131-6, bibl. 1.
Deficiencies both of potassium and of magnesium are widespread in tung orchards of the south-eastern United States. In many instances the leaf symptoms of these two deficiencies are so similar as to render it difficult to distinguish between them, except by quantitative analysis of the leaves. A quick tissue test for potassium and magnesium deficiencies in tung is described. Data are presented showing a highly significant correlation between the quick-test determinations of potassium and magnesium and the quantitative analyses of the leaf blades. The top, middle, and bottom sections of the petiole differed greatly in composition. The relation of the composition of the petiole parts to that of the leaf blade varied for the different elements and even for different levels of the same element, but in general there was a high positive correlation. [From authors' summary.]—U.S.D.A., Gainesville, Fla.

2156. FISHER, E. G., LAGASSE, F. S., AND LASSITER, J. H. 633.85-1.84
A comparison of winter and spring applications of ammonium nitrate to tung trees.
Proc. Amer. Soc. hort. Sci., 1947, 50: 142-4, bibl. 1.
An experiment with 7-year-old tung seedlings at Brooker, Florida, is reported. The evidence presented supports earlier work and suggests that applications of nitrogen can be made in winter during December and January without undue risk of loss by leaching.—U.S.D.A., Fla.

2157. BAHRT, G. M., AND POTTER, G. F. 633.85-1.8
Effects of nitrogen, phosphorus, and potassium on growth and yield of tung trees and composition of fruits.
Proc. Amer. Soc. hort. Sci., 1947, 50: 137-41, bibl. 5.

The results are recorded from an experiment with 6-year-old tung seedlings at Luccdale, Mississippi. "Nitrogen significantly increased trunk cross-sectional area of tung trees, yield of fruit, and percentage of kernel in the whole fruit, but decreased the oil content of the kernel significantly. Percentage of oil in the whole fruit was not affected. Although the additional increments of phosphorus applied were absorbed by the tree in amounts that finally increased the phosphorus content of the leaves appreciably, no response was observed in growth, production, or composition of the fruit. Potassium had no significant effect on growth or yield, but increased the oil content of the kernel, and in 1943 also improved the kernel content of the fruit and percentage of the oil in the whole fruit."—U.S.D.A., Bogalusa, La.

2158. HAMILTON, J., AND GILBERT, S. G. 633.85-2.19: 546.56
The relation of fertilization with copper and nitrogen to copper deficiency symptoms, leaf composition, and growth of tung.
Proc. Amer. Soc. hort. Sci., 1947, 50: 119-24, bibl. 8.

An account of 2 experiments carried out in Florida during 1943-44 the results from which support the hypothesis that for normal growth a satisfactory physiological balance between copper and nitrogen must be maintained in the leaves of tung trees. If this balance is disturbed during a period of active growth by insufficient copper, or by excessive N, copper-deficiency symptoms develop.—U.S.D.A., Gainesville, Fla.

2159. POTTER, G. F., SITTON, B. G., AND McCANN, L. P. 633.85-1.55-1.8
The effect of different rates of application of nitrogen on biennial bearing in tung.
Proc. Amer. Soc. hort. Sci., 1947, 50: 125-30, bibl. 3.

Complete defruiting of heavily loaded tung trees in 1941 set up a biennial bearing tendency that persisted through 1944, even though the crop on both defruited and check trees was largely destroyed by frost in 1943. Applications of nitrogen increased average yields, but did not reduce the alternate bearing tendency. The defruiting significantly increased percentage oil content of the succeeding crop. [Authors' summary.]—U.S.D.A., Bogalusa, La.

Other crops.

2160. MORET, M. 634.1/8(64)
Expérimentation et vulgarisation. (The popularization of exotic fruits in Morocco.)
Fruits d'Outre-Mer, 1948, 3: 164-8, illus.

Observations and experiments carried out at the Station Régionale Horticole de Rabat (Jardin d'essais) indicate that the following exotic fruits should do well in Morocco: Guava (*Psidium cattleyanum* and *P. piriferum*); American *Rubus* spp., such as loganberry, Youngberry and Boysenberry; Chinese dwarf banana (*Musa chinensis*); cherimoyer; feijoa; avocado. The requirements of each are stated.

2161. EVREINOFF, V. A. 634.451
Le plaqueminier du Japon ou kaki. (The Japanese persimmon or kaki.)
Fruits d'Outre-Mer, 1948, 3: 124-32, bibl. 21, illus.

An account of the biology and cultivation of *Diospyros kaki*.

2162. SCHROEDER, C. A. 634.451-1.541.11
Rootstock influence on fruit-set in the Hachiya persimmon.
Proc. Amer. Soc. hort. Sci., 1947, 50: 149-50, bibl. 3.

An investigation at Los Angeles into blossom production and fruit shedding in the Hachiya persimmon as related to its rootstocks. The rootstocks used were *Diospyros kaki*, *D. lotus* and *D. virginiana*. The conclusions suggested by the data are: (a) a satisfactory yield in the Hachiya persimmon is obtained if 4 to 5% of the flowers mature as fruits; and (b) the relatively small yields obtained from Hachiya on *Diospyros lotus* rootstock are not the result of fewer flowers produced, but of a smaller percentage of flowers which mature as fruits.—Univ. California.

2163. HODGSON, R. W., AND SCHROEDER, C. A. 634.451-1.55
On the bearing behaviour of the kaki persimmon (*Diospyros kaki*).
Proc. Amer. Soc. hort. Sci., 1947, 50: 145-8, bibl. 7.

A yield study is reported of 94 persimmon trees on lotus rootstock (*Diospyros lotus*) growing at Riverside, California. From the analysis of yields it is concluded that the tendency towards alternate bearing is strongly marked in horticultural varieties of the kaki. This behaviour is markedly similar to that reported for the Fuerte avocado, the Valencia orange and the loquat.—Univ. California.

2164. SCHROEDER, C. A. 634.413: 581.162.3
Hand pollination of cherimoya improves fruit set.
Yearb. Calif. Avocado Soc. 1947, pp. 67-70, illus., reprinted from *Calif. Agric.*

Poor quality and irregular cropping of the cherimoyer in California results from inadequate pollination. The tree, its fruit and its flowers are described. Illustrated instructions are given on hand pollination.—Div. Hort., Univ. California.

2165. SCHROEDER, C. A. 634.74
The Kei apple [*Dovyalis caffra*].
Yearb. Calif. Avocado Soc. 1947, pp. 71-3, illus.

A description of this thorny, subtropical evergreen, native to the Kei River area of South Africa. Moderately hardy. Will stand temperatures of 20° F. Makes an excellent hedge plant, spaced at 3 to 5 ft. intervals. Its flowers (dioecious) and fruits are described and illustrated. The aromatic and extremely acid fruit has considerable jelling power.

2166. EVREINOFF, V. A. 634.574
Le pistachier. (The pistachio.)
Fruits d'Outre-Mer, 1948, 3: 45-50, bibl. 18, illus.

The pistache, *Pistacia vera*; varieties, propagation, rootstocks and cultivation are discussed.

2167. (DAVATCHI, A.) 634.574-2.752
Complementary note on two coccid pests of pistachio. [Iranian and French.]
Publ. trimestr. Dep. gen. Prot. Pl. Tehran, No. 3, 1947, pp. 21 and 49.

The two coccid pests of pistachio mentioned previously have now been identified as *Aonidiella inopinata* Leon. and *Eulecanium rugulosum* Ach.

2168. KIRIUKHIN, G. 634.574-2.6/7
The insect pests of the pistachio nut in Iran. [Iranian, French summary 2½ pp.]
Publ. trimestr. Dep. gen. Prot. Pl. Tehran, No. 1, 1946, pp. 8-24, bibl. 4.

In southern Iran there are wild *Pistacia* species on which insect pests form the pistachio fauna, and nearly all are found on the cultivated forms. The most important are described.

SUB-TROPICAL CROPS—TROPICAL CROPS

2169. LARROQUE, P. 633.853.55
Le ricin, résultats obtenus en Indochine et possibilités en Afrique. (The castor-oil plant, results obtained in Indo-China and possibilities in Africa.)
Océagineux, 1948, 3: 206-13, bibl. 3.
Introductory notes on the adaptability, variability and classification of castor are followed by a description of the author's methods of plant selection. Four races are distinguished: *Ricinus communis major*, *R. communis minor*, *R. persicus*, and *R. zanzibarensis*. The last three, which are of agricultural interest, are described at some length. As a result of selection carried out over 3 or 4 generations about 30 cultivated varieties have been developed suited to the various climates of Indo-China. Yields there vary from 1,000 to 2,500 kg. per hectare [=890 to 2,230 lb. per acre], the oil-content of the seed being 51-57%. The main characters of 9 Indo-Chinese selections are briefly described. The author believes that the castor crop could succeed in Africa [French tropical?] if plant selection were carried out on the spot.

2170. LEONARD, O. A., ANDERSON, W. S., AND GIEGER, M. 633.492
Effect of nutrient level on the growth and chemical composition of sweetpotatoes in sand cultures. *Plant Physiol.*, 1948, 23: 223-37, bibl. 13, being *Pap. Miss. agric. Exp. Stat.* 149.
Sand culture experiments with Triumph sweet potatoes showed that unsuitable nutrient balance might lead to deficiencies (e.g. of calcium and magnesium) resulting in

2171. HAAS, A. R. C. 634.63: 581.192
Varietal differences in the calcium, magnesium, potassium, and total phosphorus content in pinnae of date palms. *Proc. Amer. Soc. hort. Sci.*, 1947, 50: 200-2, bibl. 3.
Data are presented for the calcium, magnesium, potassium, and total phosphorus content of the pinnae of 15 varieties of date palms growing under the same environmental conditions in the Coachella Valley in southern California. The data show a wide range of content of the different constituents according to the palm variety. The pinnae of the most mature and healthy leaf of Deglet Noor, one of the chief commercial palm varieties, were found to contain large concentrations of calcium, relatively low amounts of magnesium and the lowest concentrations of potassium and total phosphorus found in the pinnae of any of the fifteen palm varieties tested. [Author's summary.]—Univ. Calif. Citr. Exp. Stat.

Noted.

2172. a COOLEY, J. S. 633.492
Sweetpotatoes—world production and food value. *Econ. Bot.*, 1948, 2: 83-7, bibl. 2.

TROPICAL CROPS.

General.
(See also 1553, 1554, 1691, 1812, 1863-1865, 1916, 2019, 2025, 2052, 2053, 2318, 2321, 2323, 2325, 2338, 2340 a, g.)

2173. CARIBBEAN COMMISSION. 635.1/7(729)
Vegetables in the Caribbean. *Crop Inquiry Series No. 5, Committee on Agriculture, Nutrition, Fisheries and Forestry of Caribbean Research Council*, Washington, 1947, pp. 87, 1 map.
This study concerns the production of vegetables, other than root crops and legumes. Separate chapters are devoted to each Caribbean territory, the subject being dealt with under the heads: seed supply, organization of production, ecological considerations, problems of cultivation, diseases and pests, relation of production to local requirements, production for export, numbers engaged in production, research, extension services, growers associations, wartime developments, etc. There is a separate chapter on the research work of the Imperial College of Tropical Agriculture, Trinidad. Three outstanding facts are said to emerge from the data presented: the unorganized nature of vegetable production, the virtual indifference with which the cultivation of vegetables is regarded, and the limited facilities available for the preservation of vegetables.

2174. MERRILL, E. D., AND PERRY, L. M. 581.9(95)
Notes on some Papuan collections of Mary Strong Clemens. *J. Arnold Arbor.*, 1948, 29: 152-68.
" This paper consists of records of various species of flowering plants occurring in Northeastern New Guinea, formerly Kaiser Wilhelms Land; 20 species and 2 varieties are described as new."

2175. GLASSMAN, S. F. 581.9(91)
A survey of the plants of Guam. *J. Arnold Arbor.*, 1948, 29: 169-85, bibl. 14.
Further exploration is needed before the flora of this island

can be understood. It is essentially Malayan. Certain species are known only from Guam and the Philippines, others are confined to Guam and Yap. The floras of the Marianas and Bonins show a marked phytogeographical discontinuity. The author has tabulated for Guam 510 species belonging to 455 genera and 100 families of vascular plants. More than half of the species recorded are distributed in the tropics of both hemispheres. Considering its isolated position the island has a low percentage of endemic species. Explanations for this are given. There are 2 maps, much reduced.

2176. MERRILL, E. D. 581.9(54)
An overlooked Flora Indica. *J. Arnold Arbor.*, 1948, 29: 186-92, 1 plate.
Refers to Pennant's *Flora Indica*, which formed part of the 4th volume of his *Outlines of the Globe* (London, 1800), and to a manuscript copy of his *Flora Indica, List of Plants and Flora of Coromandel*, pp. 145.

2177. FENNELL, J. L. 633/635: 551.566.1
Temperate-zone plants in the tropics. *Econ. Bot.*, 1948, 2: 92-9.
The behaviour in the tropics of plants from the temperate zones is discussed, as it is affected by disease, humidity, temperature, length of day and absence of winter dormancy. Breeding can often produce new varieties of plants that thrive in the tropics. A plea is made for closer co-operation between plant research workers in the temperate zones and the tropics.

2178. HALCROW, M., AND CAVE, J. M. 63(729.86)
Peasant agriculture in Barbados. *Bull. Dep. Sci. Agric. Barbados* 11 (new series), 1947, pp. 83, bibl. 27.
A report which records the considerable mass of information obtained during the previous 5 years in connexion with plans for improving peasant agriculture in the Colony. Section II contains figures of fruit and tree-crop production.

2179. IRVINE, F. R. 633/635: 551.566.1
Some tropical plants and their uses.
 Oxford University Press, London, 1948, pp. 94, illus., 1s. 6d.
 One of the series, Simple Science in Simple English, based on a standard vocabulary of 1,500 words. His teaching experience in the Gold Coast has made the author well qualified to prepare this primer in tropical economic botany. The material is not confined to crops grown in the Gold Coast, and the book should be of great value to students, whose mother-tongue is not English, throughout the tropics.

2180. CROEGAERT, J., AND LIVENS, J. 631.4(675)
Variabilité et corrélations de quelques constantes chimiques dans les sols de Yangambi. (Variation and correlation of some chemical characteristics of Yangambi soils.) [Belgian Congo.] *C.R. Semaine agric. Yangambi*, 1947, pp. 655-63, being *Commun. 71*.

Soils under forest and oil palm are compared. Under healthy cacao the pH was generally greater than 4.5.

2181. LEFÈVRE, P. C. 633: 632.6/7
De quelques plantes économiques, cultivées à la station expérimentale de Mulungu-Tshibinda (Kivu), et de leur résistance à leurs ennemis. (The pest resistance of certain economic plants cultivated at the experiment station of Mulungu-Tshibinda (Kivu).) [Belgian Congo.] *C.R. Semaine agric. Yangambi*, 1947, pp. 682-5, bibl. 3, being *Commun. 48*.

Coffea arabica, *Ipomoea batatas*, *Solanum tuberosum* and *Cinchona ledgeriana*.

2182. WATSON, E. F. 631.875
The utilization of water hyacinth in Bengal.
Soil and Health, 1946, 1: 209-10.

The water hyacinth yields an excellent compost. Spread the plants thinly to wilt in the sun for a week or two, then mix with some other material, such as rough dry grass, wilted weeds, or leaves. This mixture should be spread in a layer about 9 in. thick, covered with 1 in. of fresh manure and sprinkled with wood ashes or finely powdered earth. The making of the heap in a so-called dol is described. The compost is ready 3 months after harvesting the material.

2183. THIMANN, K. V. 632.954: 577.17
Use of 2,4-dichlorophenoxyacetic acid herbicides on some woody tropical plants.
Bot. Gaz., 1948, 109: 334-40, bibl. 12, being *Publ. (J.S.) Atkins Gdn Res. Lab. Cuba 1*.

Aroma marabu, *Dichrostachys nutans*, a thorny leguminous plant, was practically controlled by a single spray of 3 g./l. or two sprays, 5 days apart, of 2 g./l. of 2,4-Dow or Weedone, proprietary preparations of 2,4-D; some regeneration occurred from the roots. The addition of 0.5% Carbowax 1500 increased the toxicity of 2,4-D to *D. nutans*. Weedone gave a 75% kill of guao, *Comocladia dentata*, a plant with vertical glabrous leaves.

Sugar cane.

(See also 2252d, f, n, 2330.)

2184. SALTER, R. M. 633.61(73)
Sugar plants [in U.S.A.].
Report of the Administrator of Agricultural Research 1947, Bur. Pl. Industry, Soils and agric. Engng., U.S.D.A., Wash., 1948, pp. 306-8, 60 cents.

The desirable characters of the sugar-cane variety C.P. 36/13, released in 1946, include improved resistance to mosaic disease and red rot, high yield, resistance to inversion of sucrose when in windrows or stored, and suitability for

mechanical harvesting. It is anticipated that this variety will be widely planted in Louisiana. As a result of a sugar-cane survey in Formosa in 1946, "155 new varieties of sugar-cane" were collected. These are being grown in quarantine on Guam island and will be available later for evaluation as commercial varieties or as breeding stock in the U.S.A., Hawaii and Puerto Rico. Experiments were continued to determine the effectiveness of treating soil with 2,4-D to prevent the germination of Johnson grass seed.

2185. DE CHARMAY, D. d'E. 633.61(698.1)-1.52
La station de sélection des cannes à sucre de la Réunion. (The sugar-cane breeding station, Réunion.) *Agron. trop.*, 1946, 1: 617-20.

An outline of the work of this station, founded in 1928 and maintained by the sugar factories. Initially selection was based on varieties available in Réunion, later on numerous introductions. More recently locally-bred canes have been distributed to farmers.

2186. KHANNA, K. L. 633.61(54)
Sugarcane in Bihar. I. Varietal position with special reference to the procedure adopted in introducing new varieties. II. Cultural aspects (North Bihar). *Indian Fmg*, 1947, 8: 116-20, 170-4, illus.

Part I is mainly an account of variety trials with CO [Coimbatore] and B [Bihar] seedling varieties. Part II, which is well illustrated, opens with a statement of underlying principles, which is followed by a brief description of some Indian farm implements and an account of cultural methods from the preparation of the land to the harvest of the cane.

2187. PARTHASARATHY, S. V., AND RAO, B. A. 633.61-1.535
Sett roots in sugarcane.

Curr. Sci., 1948, 17: 124, bibl. 3, illus.
 The behaviour of normal sugar-cane setts [cuttings] was compared with those in which the root initials above the node were removed before planting so that no sett-roots could develop. The absence of sett-roots did not affect sprouting and their absence forced the sprouts to develop shoot-roots much earlier than in the controls. It is suggested that this knowledge might be used for inducing the early development of shoot-roots, which are more vigorous than sett-shoots, this vigour being correlated with the vegetative vigour of the cane.—Sugarcane Research Station, Anakapalle.

2188. SINGH, S. B. 633.61
A new and lucrative rotation for sugarcane.

Indian Fmg, 1947, 8: 181-2.
 The rotation is: groundnuts—arhar (*Cajanus*)—sugarcane. The first two are sown together "with the break of the monsoon", the *Cajanus* 2½-3 ft. apart in lines 9 ft. apart with the groundnuts between in lines 18 in. apart. After the groundnuts have been harvested in November their place is taken by sugarcane planted in February. The *Cajanus* is harvested in March, by which time the sugarcane has begun to grow. Some advantages claimed for this rotation are: the two leguminous crops, one deep- and the other shallow-rooted, fertilize the soil for the sugarcane; the farmer harvests two cash and food crops, without irrigation or manure, and a good sugarcane crop, over a period of two years.

2189. SUBBAIAH, M. 633.61: 581.5
Studies on pith in sugarcane. I. A new method for the quantitative estimation of "pith" in sugarcane.

Mysore agric. J., 1947, 26: 25-35.
 A simple formula is given for calculating the percentage of pith. The variation of pith development with time of

planting is shown. Some varieties planted in summer showed little tendency to form pith, whereas the same varieties planted in winter developed pith. It is claimed that flowering in sugar-cane has no effect on pith development.

2190. KING, N. N. 633.61
Methods of dealing with dead cane crops.
Proc. Qd Soc. Sugar Cane Tech., 14th Conf.,
1947, pp. 91-8, bibl. 1, illus.

An account of various methods used by growers for dealing with dead sugar-cane crops on a large scale following severe drought and frost. It appears that the most expeditious method for getting the land back into cane was pre-burning, to get rid of the trash, followed by rolling and rotary hoeing. This last operation effectively chopped up the dead cane and mixed it with the top 6 in. of soil.—Bur. Sug. Exp. Stations, Bundaberg.

2191. STEPHENSON, R. A., AND DOOLAN, A. 633.61
An investigation into the effects of delay on burnt cane.
Proc. Qd Soc. Sugar Cane Tech., 14th Conf.,
1947, pp. 197-207, bibl. 7.

A report on investigations into the effect of delay (a) before and (b) after harvesting burnt cane. It appears from these investigations that it is economically possible to salvage at least part of a prematurely burnt crop. If the fire occurs within 14 days of crushing, immediate topping of the canes "should be beneficial", provided the crop is far enough advanced for harvesting. In the tests reported, weather changes were not accompanied by consistent variations in the behaviour of the cane: such behaviour was probably more closely related to the intensity of the burn. Delay in the milling of harvested burnt cane must be avoided.

2192. CAMUGLIA, G. 633.61-1.8
A new type of fertilizer spreader [for sugar-cane].
Proc. Qd Soc. Sugar Cane Tech., 14th Conf.,
1947, pp. 209-10, illus.

A description and illustration of a machine designed for distributing ammonium sulphate. It is narrow enough to pass between the cane rows, light in draught, strong enough to carry a good load and capable of breaking lumps of fertilizer. Moreover, it has few moving parts, is easy to clean, and resists corrosive action. Drawn by a horse it will treat 16 acres a day, or 20 acres if drawn by a narrow tractor.

2193. SLOAN, W. J. S. 633.61-2.5
The weed problem [in Queensland].
Proc. Qd Soc. Sugar Cane Tech., 14th Conf.,
1947, pp. 107-13.

After listing some important weeds of sugar-cane in Queensland the author discusses control by means of (1) cultivation, (2) weedicides (including 2,4-D), and (3) flaming.—Bur. Sugar Exp. Stations, Brisbane.

2194. LAKSHMIKANTAM, M., AND SANKARAM, A. 633.61-1.84
Influence of graded doses of nitrogen on the quality of cane juice and jaggery recovery.
Curr. Sci., 1948, 17: 90-1.

A note on the results of a study of the optimum nitrogen requirements of sugar-cane in respect of juice quality and jaggery recovery. Studies at Anakapalli have shown "that 100 lb. of nitrogen [per acre], as groundnut-cake, is the optimum [application] from the point of view of yield and cost of production per unit weight of cane and jaggery".—Sugarcane Res. Stat., Anakapalli.

2195. D'AVICE, R. 633.61(68)-1.56
A report on a mission to South Africa.
Rev. agric. Maurice, 1948, 27: 2-27.

The report, dated August, 1947, is mainly concerned with the methods used for weighing cane juice and imbibition

water and the results obtained with the Oliver-Campbell mud filter in South African sugar-cane factories.

2196. BUZACOTT, J. H. 633.61-2.796
Notes on termites which damage sugar-cane in north Queensland.
Proc. Qd Soc. Sugar Cane Tech., 14th Conf.,
1947, pp. 135-40, bibl. 11, illus.

A list is given of 12 termite species, one of them new. Short notes are given on each and reference is made to an easy method of identification by field officers. It is probable that there are several other species which attack sugar-cane.—Bur. Sug. Exp. Stations, Gordonvale.

Coffee.

(See also 2181, 2252e, j, m.)

2197. KLINKOWSKI, M. 633.73
Die Wanderungswege des Kaffeebaumes. (The origin and distribution of coffee.)
Züchter, 1947, 17-18: 247-55, bibl. 11.

Climatic requirements of coffee and the history of its distribution.

2198. MAYNE, W. W. 633.73(54)
A note on coffee research in South India.
Publ. Indian Coffee Bd., Bangalore, 1946 [?],
pp. 72, Rs. 2.8, Sh. 3/6 [received 1948].

Part of a report submitted to the Indian Coffee Board on the organization of coffee research in South India, dealing with the initial programme of work recommended for the research organization. There are chapters on: the field management of the coffee bush (*arabica* and *robusta*), disease and pest control, improvement of planting material, vegetative propagation, rehabilitation of poor coffee, preparation for market, co-operative experiments on estates, etc.

2199. COINER, M. S. 633.73(8)-1.55
The coffee-harvest timetable in Latin America.
Foreign Agric., 1948, 12: 96-7, illus.

The months of the coffee harvest in 12 Latin American countries are shown in tabular form.

2200. BERGAMIN, J. 633.73-2.76
O "repasse" como método de controle da broca do café *Hypothenemus hampei* (Ferr., 1867) (Col. *Ipidae*). (The collection of unharvested fruit to control the coffee berry borer.)
[English summary 1 p.]
Arg. Inst. Biol., 1944, 15: 198-208, bibl. 8
[received 1948].

The following treatments were compared: removal of fruit remaining on the bushes after harvest, collection of fallen fruit from the ground, and removal of all unharvested fruit whether fallen or still on the bushes. The removal of all unharvested and fallen fruit significantly reduced infestation in two trials. Where the coffee was growing vigorously, collection of fallen fruit only was beneficial.

2201. GEORTAY, G. 633.73-1.8
Note sur quelques expériences culturales relatives au caféier *robusta*. (Note on some cultural experiments with *robusta* coffee.)
C.R. Semaine agric. Yangambi, 1947, pp. 440-7,
being *Commun. 31*.

Establishment.—A comparison of planting after (1) thinning the forest cover, (2) clearing without burning, and (3) clearing and burning. Early results indicate the advantages of burning. *Mulching*.—Planted between widely spaced coffee bushes, *Indigofera arrecta* and *Pennisetum* sp. failed to produce enough material to mulch the coffee plants; their places were taken by *Flemingia* sp. and lemon grass. *Mulching* produced an insignificant increase in yield per

TROPICAL CROPS

bush, and unmulched coffee at normal density, with a controlled leguminous cover, produced a greater yield. *Organic manure.*—Applied as a surface mulch or buried in one trench per two bushes, forest leaves were without effect on coffee yields; yields were higher when the same quantity was applied in one trench per bush, but the cost of application greatly exceeded the increased return.

2202. PERMANNE, R. L. 633.73-1.874
 Note sur le compostage des caféiers. (Note on the use of compost for coffee.)
C.R. Semaine agric. Yangambi, 1947, pp. 424-6, being *Commun. 27*.
 At current costs and prices an annual increase in yield of 110 to 115 kg./ha. of green coffee sustained over 4 years would offset the cost of applying compost as described in this note. The economic value of this application can be decided only after the harvest of 1950.

2203. POSKIN, J. H., AND THIRION, F. 633.73-1.4
 Méthodes culturales propres à assurer la protection du sol dans les caféières. (Cultural methods of protecting soil under [robusta] coffee.)
C.R. Semaine agric. Yangambi, 1947, pp. 431-5, being *Commun. 29*.
 After the forest has been felled, ridges 3½ to 4 m. wide are opened every 7 m., the debris is heaped up in between and the coffee planted at a density of 930 per ha. Although in the first four harvests the yield is 25% less than from coffee planted at 3 m. × 3 m. (1,090 per ha.) after burning, the difference can be reduced by interplanting a further 300 to 350 stands 4 years after clearing, and the coffee bushes remain in better condition. *Shade.*—At Yangambi shade is desirable for coffee, *Albizia moluccana* and *Erythrina lithosperma* being suitable shade trees. *Pruning.*—Unrestricted growth of coffee helps to protect the soil. Clean weeding must be avoided.

2204. TEIXEIRA MENDES, C. 664.8: 633.73
 O envelhecimento do café. (The ageing of coffee.)
Rev. Agric. São Paulo, 1948, 23: 81-6.
 Liquoring tests were made with coffee, stored under various conditions for several years. The following conclusions were drawn: For prolonged storage of coffee as dried cherry or as processed coffee in bags, a dark, dry and well-ventilated place should be used. Light, dampness, and bad odours must be avoided. With the small samples used, there was little difference between processed coffee and coffee stored as dried cherry. In some cases flavour was improved by storage for ten years or more.—University of São Paulo, Brazil.

2205. HOWARD, A. 633.73-1.8
 El abonamiento del cafeto. (Manuring coffee.)
Rev. Inst. Def. Café Costa Rica, 1948, 18: 505-7, from *El Café de El Salvador*.
 Repeated applications of fresh compost made with animal excreta by the Indore process is said to favour the development of a mycorrhizal association in coffee.

2206. CONSEJO INTERAMERICANO ECONÓMICO Y SOCIAL. 633.73-1.576
 La utilización de la pulpa seca del café como alimento para el ganado en los países tropicales de América. (Utilization of dried coffee pulp as stock food in the tropical countries of America.)*
Mim. Publ. Panamer. Union, Washington, D.C., 1947, pp. 50.
 The main purpose of this publication is to encourage the recovery and use as fodder of coffee pulp, generally regarded as an undesirable waste product. Dried pulp and ensiled pulp have been fed to milch cows in Central America, and papers describing the preparation and use of these products are reprinted as appendices.

* Translation available on loan at this Bureau.

2207. ALVAREZ GARCÍA, L. A. 633.73-2.4
 Studies on coffee root disease in Puerto Rico. I. A coffee fusarium wilt. [Spanish summary 3 pp.]
J. Agric. Univ. Puerto Rico, 1945, 29: 1-29, bibl. 78, illus. [received 1948].
 A wilt disease of coffee is described. It was induced in seedlings grown in the greenhouse by inoculation with *Fusarium bulbigenum* var. *coffae*, but not by *Rosellinia bainoides*. The latter is frequently associated with this disease, apparently as a saprophyte. The effects on the fungus of temperature, humidity and pH are described and control measures are discussed.

2208. APPANNA, M. 633.73-2.76
 The biology and control of the shot-hole borer *Xyleborus morstatti* Hagn. of *Coffea robusta*. *Mysore agric. J.*, 1946, 24: 70-4, bibl. 3 [received 1948].
 The shot hole borer of robusta coffee in Mysore can be controlled by reducing overhead shade and pruning affected twigs 1 to 1½ in. below the emergence hole.

2209. VAN DER GOOT, P. 633.73: 632.752.3 + 632.961(912)
 Biologische bestrijding van witte luis (*Phenacoccus iceryoides* Gr.) op koffie in de Toradjalanden (Zuid Celebes). (Biological control of a mealybug (*Phenacoccus iceryoides* Green) on coffee in the Toradjia district (South Celebes).) [English summary 1½ p.]
Landbouw, 1948, 20: 107-16, bibl. 16, being *Meded. alg. Proefstat. Landb.* 64, and *Meded. Inst. Plziekt.* 102.
 The writer discusses various attempts to use the coccinellid beetle, *Cryptolaemus montrouzieri*, for biological control in Indonesia. Success depends on the presence of the mealybugs throughout the year and the scarcity or absence of attendant ants. These conditions were fulfilled in an outbreak of *Phenacoccus iceryoides* on coffee, which was controlled in a few months.

Cacao.

(See also 2180, 22521.)

2210. OCHSE, J. J. 633.74(922+883)
 The cacao industry of Java and Surinam.
Cacao Inf. Bull. Turrialba,* 1948, 1: 8: 1-2, bibl. 4.
 Until about 1929 little attention was paid to the cultivation of cacao in Java, partly because of the damage caused by *Acrocercops cramerella* and *Helopeltis* sp. The success of the Foresterio × Criollo hybrids of Wellensiek and de Haan opened up new possibilities. Brief notes are given on the principles governing the selection of mother trees. In Surinam, never a large producer, interest in the crop had almost disappeared until, following the lead set by Trinidad, the vegetative propagation of selected clones was begun a couple of years ago.

2211. ANON. 633.74(728/729)
 Cacao survey yields valuable information.
Cacao Inf. Bull. Turrialba, 1948, 1: 5: 2.
 Reference to the survey of the cacao producing centres of Columbia, Nicaragua, Trinidad and Grenada carried out in 1945 by R. L. Fowler, U.S.D.A., in connexion with cacao improvement in Ecuador, is followed by brief notes and figures relating to the cacao industries in those countries.

2212. ANON. 633.74(728.6)
 Cacao investigations are summarized.
Cacao Inf. Bull. Turrialba, 1948, 1: 4: 1.
 A short note on investigations under way, or planned, at

* This publication also appears in Spanish as *Boletín Informativo del Cacao*.

TROPICAL CROPS

the Cacao Centre at Turrialba, grouped under three main heads: normal plant performance, selection, and breeding. The numerous subdivisions of the work under these heads are indicated.

2213. CROEGAERT, J. 633.74(675)

Note sur quelques sols à cacaoyers au Congo belge. (Some cacao soils in the Belgian Congo.)
C.R. Semaine agric. Yangambi, 1947, pp. 582-8,
bibl. 13, being *Commun. 41*.

Small patches of soil suitable for growing cacao exist in various parts of the central Congo basin. The climatic and soil requirements of cacao are discussed.

2214. THIRION, F. 633.74(675)

Le cacaoyer, quelques modes de culture expérimentés à Yangambi. (Some methods of growing cacao, tried at Yangambi.) [Belgian Congo.]
C.R. Semaine agric. Yangambi, 1947, pp. 427-31,
being *Commun. 28*.

For the satisfactory growth of cacao it is essential to have suitable soil, rich in minerals and humus and with a good water supply, and it must be shaded. Of the methods of establishment tried at Yangambi the simplest and cheapest is sowing under controlled forest cover, from which species harmful to cacao (e.g. *Pipradenia* sp.) have been removed. Clearing without burning helps to cover the soil and provides organic matter; burning should only be practised on soils rich enough to support food crops between the cacao. At Yangambi cacao planted at a density of 1,300 to 1,500 per ha. gives a closed cover from the fourth year.

2215. HACQUART, A. 633.74(675)-2.8

Quelques observations sur les plantations de cacaoyers au Mayumbe. (The cacao plantations at Mayumbe.) [Belgian Congo.]
C.R. Semaine agric. Yangambi, 1947, pp. 463-8,
being *Commun. 82*.

Remarks about the menace of swollen shoot and the control of *Sahlbergella*.

2216. NEWHALL, A. G. 633.74-2.3/4 + 2.8

Research at Turrialba on cacao disease.
Cacao Inf. Bull. Turrialba, 1948, 1: 7: 1-4.

A progress report for the 6 months ending 1st April, 1948. Brief notes are given on some of the more important diseases of cacao in Costa Rica, their causal organisms, life cycles, and symptoms. The potency of a number of fungicides, including some of the new organic forms, was tested against their spores in the laboratory, and against *Phytophthora* in seed-beds. Pod rot caused by *Phytophthora faberi* (*P. palmivora*) is responsible for greater loss of crop in Costa Rica than all other diseases combined. It is estimated that between 1st September and 31st December, 1947, 50% of the pods were lost through this fungus on many plantations.

2217. ANON. 633.74(729)

Research, new techniques and government aid in Trinidad.
Cacao Inf. Bull. Turrialba, 1948, 1: 6: 1.

Reference is made to cacao yield studies in Trinidad comparing budded stock with rooted cuttings. The latter are preferred, although there is no statistical evidence in their favour. The disadvantages of budding are enumerated. Imperial College Selections show a wide range of susceptibility to disease. The value of these cacao clones lies primarily in their high yielding capacity rather than in their disease resistance. The most promising disease-resistors are certain Amazonian selections. The Government scheme for rehabilitating certain cacao areas is described.

2218. BOWMAN, G. F. 633.74-1.535

Rooting cacao cuttings—an improved method.
Cacao Inf. Bull. Turrialba, 1948, 1: 5: 1.

A method suitable for the small grower who cannot afford the initial expense, or the time, necessary for glass-covered

concrete propagation bins (described in *5th Ann. Rep. Cacao Res. I.C.T.A.*, 1935). In this improved method a propagating bed (unshaded) is made in a shallow ditch in which gravel, for drainage, is placed below and 9-10 in. of clean sand above. Cuttings, prepared as for propagating bins, are dipped in Hormodin No. 2, or similar root stimulant, inserted in the sand and kept under a continuous light spray of water during daylight, the spray acting as a substitute for shade. After 3-4 weeks all rooted cuttings are transferred to a raised and shaded nursery bed of ordinary soil and sprayed for 6 to 8 days, the daily duration of the spraying being gradually reduced until it is given "during the late noon hour only". In another 1-4 months the plants are ready for transplanting in the field. Cuttings can be given as little as 16 sq. in. each so that a bed 12 ft. \times 4 ft. will hold 425 cuttings, which should supply approximately 350 rooted plants per month. "In this outdoor rooting method it has been found that shade is unnecessary if water supply is dependable, and the best results were obtained in full or nearly full sunshine." [It is somewhat difficult to reconcile this last statement with the earlier one describing the transfer of rooted cuttings to a shaded bed.]

2219. NEWHALL, A. G. 633.74-2.411

Technical and scientific developments [in cacao research].

Cacao Inf. Bull. Turrialba, 1948, 1: 3: 1.

It has been shown that the embryos of ripe seeds in cacao pods which are infected with *Phytophthora* may themselves become infected. The fungus has been recovered from all parts of the pods 2 weeks after their artificial inoculation with the pathogen. Over 60% of the embryos from seeds of such pods were found to be infected. It has not yet been determined how long the fungus can remain viable inside infected seeds, or whether it can survive the ordinary drying and curing processes. A method of culturing *Phytophthora faberi* on peanut shells in 1% dextrose solution was found to give an abundance of viable conidia for inoculation purposes. Ripe or green cacao pods held in large sterile containers were equally satisfactory as a source of these spores but contamination could not always be avoided. By spraying 6-weeks-old seedlings with a fresh spore suspension it was possible to infect 100% and to kill 90% of susceptible cacao seedlings within 3 or 4 weeks. A method of eliminating susceptible seedlings in a short period is thus available. The connexion between susceptibility of seedlings and that of pods has not yet been definitely established.

2220. POSNETTE, A. F., AND STRICKLAND, A. H. 633.74-2.8

Virus diseases of cacao in West Africa.

Ann. appl. Biol., 1948, 35: 53-63, bibl. 8.

Swollen-shoot virus of cacao (cacao virus 1A) is transmitted by all stages of the mealybugs *Pseudococcus njalensis* Laing and *Ferrisia virgata* Ckll. These insects become infective after feeding for less than 4 hours on the infected plant, and transmit after less than 3 hours on the test plant. The virus is non-persistent in the vector after 3 hours test-feeding. The vectors can collect virus from either leaf, green shoot, bark or pod; the young symptom-bearing leaf is the best for infection-feeding and the cotyledon of the bean for test-feeding.—West African Cacao Research Institute, Tafo, Gold Coast.

Oil palm.

(See also 2252g, k.)

2221. MENSIER, P. H. 633.85(66)

Les plans de production des oléagineux dans les colonies britanniques et françaises d'Afrique. (Plans for producing vegetable oils in the British and French Colonies in Africa.)

Oléagineux, 1948, 3: 257-61, bibl. 4.

A comparison of the schemes for augmenting supplies of groundnuts and oil palm products. *Oil palm.*—The French territories have four research stations, and a fifth is soon to be opened; eight oil mills are being constructed, with a total production capacity of 17,000 tons of oil annually and capable of extension to 47,000 tons. In Togoland and Dahomey palm groves are to be improved; plantations are to be established in the Ivory Coast, Cameroons and French Equatorial Africa. In Nigeria there is only one research station. "Pioneer" oil mills, each with an annual production of 500 tons, are being established there.

2222. RINGOET, A. 633.85: 581.11

Sur la transpiration d'une plantation d'Elaeis guineensis. (The transpiration of an oil palm plantation.)

C.R. Semaine agric. Yangambi, 1947, pp. 212-23, being Commun. 17.

Transpiration was measured by weighing the leaflet at short intervals after its removal from the plant. Solar radiation, temperature, saturation deficit and wind speed were recorded while transpiration was being measured. The transpiration of the oil palm and several cover plants dropped between 11 a.m. and noon in fine weather, apparently because excessive illumination brought about the closing of the stomata*; later it increased, apparently on account of the high temperature and saturation deficit, because the stomata re-opened very slowly. It is suggested that the direct intake of dew and rain water by oil palm leaves has but little effect on the water relations of the plant.

2223. VANDERWEYEN, R., ROSSIGNOL, J., AND MICLOTTE, H. 633.85: 581.1

Contribution à l'étude biométrique de l'Elaeis guineensis. (Contribution to the biometric study of the oil palm.)

C.R. Semaine agric. Yangambi, 1947, pp. 435-9, bibl. 3, being Commun. 30.

A study of variation of several characters of the inner and outer fruits, within and between bunches of *tenera* and *dura* oil palms. The size of sample needed to estimate each character within limits is indicated. At least 20 bunches of fruit should be analysed to determine the values for a palm. Bunch characters, such as percentage fertilization, are even more variable and at least 35 samples should be examined. The oil content of the dry mesocarp is a function of the moisture content of the fresh mesocarp; at least 35 bunches should be analysed to estimate the moisture content.—Yangambi.

2224. VANDERWEYEN, R., ROSSIGNOL, J., AND MICLOTTE, H. 633.85-1.531

Contribution à l'étude du pouvoir germinatif des graines d'Elaeis. (The germination capacity of oil palm seed.)

C.R. Semaine agric. Yangambi, 1947, pp. 448-52, being Commun. 32.

Experiments using a fermentation box showed that the germination of oil palm seed did not depend on the age of the palm when this lay between 3 and 8 years. Storage of *tenera* seed in charcoal for 4 months did not affect germination; the speed and percentage of germination diminished slightly in the first ten months, and thereafter more rapidly. *Dura* seed was stored for 12 months with little change.—Yangambi.

2225. VANDERWEYEN, R., ROSSIGNOL, J., AND MICLOTTE, H. 633.85-1.55

Essais sur la détermination des pertes de poids des régimes et des fruits d'Elaeis après récolte. (The loss in weight of oil palm fruits and bunches after harvest.)

C.R. Semaine agric. Yangambi, 1947, pp. 452-62, being Commun. 33.

* cf. *Coffea arabica*, vide Nutman, F. J., H.A., 7: 457, 1019, 1020.

The determination of mean fruit weight should be made directly the fruit has been stripped from the bunch, for bunch and fruit lose moisture rapidly. The nut dries out less rapidly, however, and the determination of weight of mesocarp, by difference (fruit less nuts), can be made the following day.

2226. VANDERWEYEN, R., ROSSIGNOL, J., AND MICLOTTE, H. 633.85: 581.192

Considérations sur les teneurs en eau et en huile de la pulpe des fruits d'Elaeis. (The oil and moisture content of the mesocarp of oil palm fruits.)

C.R. Semaine agric. Yangambi, 1947, pp. 730-50, being Commun. 54.

Oil content may be estimated from moisture content.—Yangambi.

Fibres.

(See also 2252b, 2331.)

2227. F.A.O. 633.5

World Fiber Survey.

Food & Agriculture Organization of the United Nations, Washington, 1947, pp. 186, \$1.00.

A short section, pp. 139-146, is devoted to the hard fibres, abaca, sisal and henequen.

2228. SALTER, R. M. 633.526.42

Sansevieria included in special fiber investigations.

Report of the Administrator of Agricultural Research 1947, Bur. Pl. Industry, Soils and agric. Engng., U.S.D.A., Wash., 1948, pp. 344-5.

"A recent official report on a test of ropes made of sansevieria states that this fiber is the best available substitute for manila hemp, that it is much superior to sisal and henequen for cordage, and that for small lines it is superior to manila because of its softness and ease of manipulation. Possibilities for the production and processing of sansevieria as a successful peacetime industry are strengthened by work on varieties and cultural practices. A transplanter, which greatly reduces the cost of planting, has been developed. Harvesting machines and artificial driers now being perfected can be adapted to sansevieria. A new method for drying fiber artificially has been developed that dries more effectively and causes less damage to the fiber than methods now in use. Designs and specifications have been prepared for a pilot plant to be constructed in connexion with the fiber laboratory built this year by the Belle Glade State Experiment Station" [Florida].

2229. TOXOPEUS, H. J., AND VAN DEN BERG, H. A. 633.525.1(910)5

Enkele gegevens over de cultuur van ramie. (The cultivation of ramie [*Boehmeria* sp.].)

Landbouw, 1948, 20: 117-25, illus.

The following topics are discussed: varieties, climate, multiplication, planting, manuring, pests, diseases, harvesting and processing.—Algemeen Proefstation voor de Landbouw, Buitenzorg.

Bananas.

(See also 2252c.)

2230. CHEESMAN, E. E. 634.771

Classification of the bananas. I. The genus

Ensete Horan. II. The genus *Musa* L.

Kew Bull., 1947, No. 2, pp. 97-106, 106-17, bibl. 7 and 6.

The author stresses the futility of taxonomic work on banana based only on herbarium material. The present papers, to be followed by a series of notes on individual species of *Musa*, are based on systematic and cytological work on the comparatively small collection growing at the Imperial

TROPICAL CROPS

College of Tropical Agriculture, Trinidad. A complete revision of banana classification would not be possible in Trinidad, where the climate is too hot for the satisfactory growth of species of the genus *Ensete*, the revival of which is urged on taxonomic, cytological and ecological grounds. [This paper will be of great value when revision of classification is made possible through the establishment of a new banana collection in a cooler climate.]

2231. DE SOYZA, D. J. 634.773(548.7)

Colour instability in some plantain varieties.

Trop. Agriculturist, 1948, 103: 38-9.

A note on observed variations in colour of stems and fruits of the Red, or "Cuba", Plantain, *Musa rubra*, and the Ash Plantain, *M. (paradisiaca) normalis*, growing in Ceylon. It appears that these variations are caused by environment or disease, but the existence of mutations is not excluded. Observations were made on 40 plantain varieties [not named].

2232. MULLER, J. 634.773(675)

Amélioration du bananier indigène. (Improvement of the native plantain.)

C.R. Semaine agric. Yangambi, 1947, pp. 342-73, bibl. 10, illus., being *Commun. 21*.

Studies of pollination, germination and the raising of seedling plantains are described. Cytological studies must precede breeding work. Initial selection is based on the study of a collection of native varieties which are fully described. Selection is based on adaptability and reproductive capacity as well as on yield and quality of fruit. Cultural methods to ensure rapid multiplication of the best material are outlined.—I.N.E.A.C., Yangambi.

2233. RIVOIRE, P. 634.771

Musas à feuillage rouge. (*Musa* spp. with red foliage.)

Rev. hort. Paris, 1947, 119: 416-17, bibl. 3.

An account of the cultivation and propagation of some ornamental *Musa* spp. in France. An editorial note refers to a method of multiplication used in Abyssinia: before the plant flowers it is completely defoliated and the apical bud is removed, so that from 80 to 100 suckers may be formed by a single plant.

2234. BRUN, J. 634.771-2.4

La maladie de Sigatoka du bananier causée par *Cercospora musae* Zimm. (The Sigatoka disease of bananas.)

Fruits d'Outre-Mer, 1948, 3: 13-20, bibl. 5, illus.

An account of the disease, and of the biology and control of the causative fungus. Very little is known about it in Africa, particularly on the west coast.

2235. VENKATAKRISHNIAH, N. S. 634.771-2.4

Pseudostem rot of plantain (*Musa sapientum* Linn.).

Mysore agric. J., 1947, 25: 68-70, bibl. 3.

Recommendations for the control of this disease, caused by *Sclerotium rolfsii*, include sanitation and the use of bordeaux paste.

Papaw.

2236. GREENWAY, P. J. 634.651

The papaw or papaya.

E. Afr. agric. J., 1948, 13: 228-33, bibl. 17, illus.

The botany, history and uses of *Carica papaya*, with notes on its etymology, home, sex variations, and vegetative propagation.

2237. WALLACE, G. B. 634.651

The establishment and running of a papaw plantation.

E. Afr. agric. J., 1948, 13: 234-9, bibl. 3, illus.

Mainly concerned with papaw growing for papain manufacture in Tanganyika Territory, where the papain output in

1946-47 was 2,573 cwt., valued at £353,850. Practical information is given on climatic and soil requirements, establishing a plantation, care of the crop in the field, harvesting and drying latex. There is an illustrated description of the open type of papain drying shed, with notes on its operation. Some yield figures are quoted.

2238. WALLACE, G. B., AND WALLACE, M. M. 634.651-2.4

Diseases of papaw and their control.

E. Afr. agric. J., 1948, 13: 240-4, bibl. 3, illus.

A list of the diseases of papaw recorded in East Africa with notes on each.—Dep. Agric., Tanganyika.

2239. HOLMES, F. O., AND OTHERS. 634.651-2.8

Ringspot of papaya (*Carica papaya*) in the Hawaiian Islands.

Phytopathology, 1948, 38: 310-12.

An account is given of papaya ringspot (virus) disease in the Hawaiian Islands. Control measures in the territory depend on the application of one or more procedures, viz. (1) control of insect vectors, particularly *Myzus persicae*, (2) substitution of immune or highly tolerant varieties of papaya for those now grown, (3) interpolation of crop-free periods, and (4) destruction of diseased trees.

Rubber.

(See also 2052-2055, 2252o, 2320.)

2240. VAN LEER, R. 633.912-2.4

Premiers résultats de la lutte contre les pourridis de l'hévéa à Yangambi. (Control of root diseases of hevea rubber at Yangambi.) [Belgian Congo.]

C.R. Semaine agric. Yangambi, 1947, pp. 691-707, being *Commun. 50*.

A slight variation of the scheme proposed by the Rubber Research Institute of Malaya is being used to control root diseases of rubber caused by *Fomes lignosus*, *Ganoderma pseudoferreum*, and *Armillaria mellea*. The influence of various factors is being studied.

Other crops.

(See also 2313, 2314, 2328.)

2241. RAMIREZ-SILVA, F. J. 634.774-1.811

The effect of certain micronutrient elements on the growth and yield of pineapple plants.

Publ. Univ. Microfilms, Ann. Arbor, 900, 1947, pp. 11-16.

An abstract of a dissertation. The micronutrients were added to culture solutions in which slips of the variety Smooth Cayenne were grown, under glass. The effects produced are described. It is concluded that more available iron in the soils would greatly improve the Puerto Rican pineapple crops.

2242. CHOWDHURY, S. 634.774(54)

Pineapple culture in Assam.

Indian Fmg, 1947, 8: 187-90, bibl. 1, illus.

Instructions are given for preparing the land, planting, cultivating, manuring and harvesting. An average yield from the plant, or first crop, is given as 10 tons per acre, but yields up to 40 tons per acre are obtainable in favourable circumstances. The varieties grown are: Giant Kew (=Smooth Cayenne), Queen, and Joldhup, the last a small, sweet, fibrous, local variety. An estimate of cost of production and profit is given.

2243. CHANDRARATNA, M. F. 634.47(548.7)

Garcinia in Ceylon.

Trop. Agriculturist, 1948, 103: 34-7, bibl. 7, illus.

Five indigenous species are mentioned, of which *Garcinia*

morella and *G. cambogia* form the subject of this paper. Descriptions are given of some botanical characters of these trees, the first of which is much used in medicine by the Ceylonese, as well as being a source of commercial gamboge. *G. cambogia* is employed extensively in the curing of fish.

2244. HERNÁNDEZ-MEDINA, E. 634.573: 633.821
The cashew—a promising support for vanilla.
[Spanish summary 10 l.]
J. Agric. Univ. Puerto Rico, 1945, 29: 30-4, bibl.
2, illus. [received 1948].

Two years after transplanting from pots to the open, seedlings of cashew, *Anacardium occidentale*, provided enough shelter and support for the satisfactory growth of vanilla.

2245. ACOSTA-SOLIS, M. 634.6
Tagua or vegetable ivory—a forest product of Ecuador.
Econ. Bot., 1948, 2: 46-57.

An account of the useful products of *Phytelephas* spp., the seeds of which pass into commerce as vegetable ivory. Although vast reserves of this slow growing palm exist in the forests of Ecuador, it is also cultivated on a small scale.

2246. DORASAMI, L. S., AND LAKSHMINARASIMHAIAH, D. P. 634.61(548)
Hints on coconut cultivation in Mysore.
Mysore agric. J., 1947, 25: 108-11.

Characters desirable in the mother palm are described; nuts for planting should be taken from dry farmed plantations. Nuts should be sown in a sandy seedbed 12 to 18 in. apart. If the field is irrigated seedlings may be set out at a year old; if not, they should be transplanted in the nursery at 3 ft. apart for final planting two or three years later. Regular watering is essential during the first two dry seasons. The soil should be ploughed regularly and green manures should be grown.

2247. MCCLURE, F. A. 633.584.5
Gifts of science—bamboo culms for industry.
Foreign Agric., 1948, 12: 39.

The U.S.D.A. is sponsoring schemes for the production and utilization of bamboos in Porto Rico. In the search for more rapid and economical methods of propagation, leafless-branch cuttings have given promising results. The desirability of developing artificial methods for inducing bamboos to flower and set seed is stressed.

2248. ANON. 633.77
Yerba maté [*Ilex paraguariensis*].
Foreign Agric., 1948, 12: 111, illus.

A short note on the growing and manufacture of maté, or Paraguay tea, the pre-war production of which in South America was 368 million lb. a year.

2249. PONNURANGAM, V. S. 633.83-1.531
Note on a better way to raise cardamom seedlings in the nursery.
Mysore agric. J., 1945, 23: 105-8 [received 1948].

The quality of cardamom seedlings in Mysore can be improved by providing thatch shelters and adequate drainage during the rainy season.

2250. WHITAKER, C. H. 633.834
Mace from Grenada's nutmegs.
Foreign Agric., 1948, 12: 32-3, bibl. 1, illus.

A short, popular article, mainly on the collecting, handling, sorting, grading and packing of mace, of which Grenada normally exports about 340 tons a year. The normal yield is given as 150 lb. of green mace per acre, equivalent to 30-40 lb. when cured; 100 lb. of green nutmegs yield about 8 lb. of fresh mace.

2251. ALTMAN, R. F. A., AND VAN DER BIE, G. J. 633.912: 633.88.51

Application of *Cinchona* alkaloids in the rubber industry.

Industr. Engng Chem., 1948, 40: 897-904, bibl. 11.

Cinchona by-product alkaloids, considerable quantities of which appear as waste in the quinine industry, were found to be suitable as vulcanization accelerators and antioxidants for rubber.—*Rubber Res. Inst.*, Buitenzorg, Java.

Noted.

2252.

a BAPTIST, B. A. 632.951
The possibilities of the utilization of DDT and gammexane for plant protection in Ceylon.

Trop. Agriculturist, 1948, 103: 12-19, bibl. 31.

b BRYNAERT, J. 633.526.23
L'avenir de la culture du sisal au Bas-Congo. (The future of sisal growing in the Bas-Congo.) *C.R. Semaine agric. Yangambi*, 1947, pp. 485-95, being *Commun. 34*. Climate and soil unsuitable.

c DODDS, K. S., AND SIMMONDS, N. W. 634.771: 581.162.3
Sterility and parthenocarpy in diploid hybrids of *Musa*.

Heredity, 1948, 2: 101-17, bibl. 19.

d DUUS, E. W. 633.61(54)
Some impressions of the Indian sugar industry. *Proc. Qd Soc. Sugar Cane Tech.*, 14th Conf., 1947, pp. 29-47.

e DE FRANCQUEN, P. 633.73-2.754
Etude biométrique préliminaire de l'incidence de *Antestia prox. lineaticollis* Stål et de ses dégâts sur *Coffea arabica* L. (Biometric study of the incidence of *Antestia* sp. and its damage on *C. arabica*.) *C.R. Semaine agric. Yangambi*, 1947, pp. 711-17, bibl. 2, being *Commun. 85*.

f HUGHES, C. G. 633.61-2.19
The symptoms of leaf scald disease in sugar cane [Queensland]. *Proc. Qd Soc. Sugar Cane Tech.*, 14th Conf., 1947, pp. 115-18.

g LIVENS, J. 633.85-1.4
Caractéristiques pédologiques de quelques palmeraies naturelles et artificielles au Kwango-Kasai. (Soil characters in natural groves and plantations of oil palms at Kwango-Kasai.) *C.R. Semaine agric. Yangambi*, 1947, pp. 570-81, bibl. 4, being *Commun. 40*.

h LOUSTALOT, A. J., AND TELFORD, E. A. 631.874
Physiological experiments with tropical kudzu [*Pueraria phaseoloides*].

J. Amer. Soc. Agron., 1948, 40: 503-11, bibl. 3, illus.

Effects of pH, drainage and mineral deficiencies.—Puerto Rico.

i d'OTSOLIG, T., AND NEUVILLE, O. G. 632.951
Note sur un essai de culture de *Derris elliptica* dans les plantations d'Egbunda et de la Nao. (Trials of *Derris elliptica* in the plantations of Egbunda and the Nao.)

C.R. Semaine agric. Yangambi, 1947, pp. 474-6, being *Commun. 109*.

j POSKIN, J.-H. 633.73-1.52
Etude d'un hybride *robusta* × *arabica*. (A *robusta* × *arabica* hybrid.)

C.R. Semaine agric. Yangambi, 1947, pp. 419-23, being *Commun. 26*. Only of interest for local markets.

TROPICAL CROPS—STORAGE

k ROELS, O. 633.85: 581.192
Analyse des acides gras d'une huile de palme congolaise. (The fatty acids of a sample of palm oil from the Congo.)
C.R. Semaine agric. Yangambi, 1947, pp. 723-5, being *Commun. 51*.

TAMMES, P. M. L. 633.74(667)
De bevolkingscultuur van cacao op de goudkust (West-Afrika). (The native cocoa cultivation in the Gold Coast area.) [English summary 1 p.] *Landbouw*, 1947, 19: 477-89, bibl. 11.
An account based on a study tour.

m VENKATARAYAN, S. V. 633.73-2.1/8
Diseases of coffee.
Mysore agric. J., 1946, 25: 3-20, bibl. 51 [received 1948].

n VOLP, P. 633.61-2.19
The ineffectiveness of roguing leaf scald infected fields for use as a source of planting material [sugar-cane].
Proc. Qd Soc. Sugar Cane Tech., 14th Conf., 1947, pp. 99-101.

o VOS, J. 633.912-1.55
Quelques données de production des clones d'*Hevea* à Yaleko. (Yield data of hevea rubber clones at Yaleko.)
C.R. Semaine agric. Yangambi, 1947, pp. 468-71, being *Commun. 84*.

p WIT, F. 633.812.42(548.7) + (922)
De citronella-grassen van Ceylon en Java. (The citronella grasses of Ceylon and Java.) *Landbouw*, 1948, 20: 97-106, bibl. 16.

STORAGE.

(See also 1867, 1868, 1879, 1880, 1963-1970, 2062.)

2253. v. d. PLASSE, J. B. 664.85

Het schoonhouden en ontsmetten van de fruitbewaarplaatsen. (Cleaning and disinfecting the fruit store.)

Fruitteelt, 1948, 38: 308-9.

The floor of the store-room should first be washed with hot soda solution, and the room then disinfected with formalin, obtainable as paraformaldehyde capsules, or as a solution. In either form it is evaporated by heating in an electric heater, which is described.

2254. HEWLETT, P. S. 664.8: 632.95

Physical factors affecting the toxicity of sprays to stored product insects. I. The quantity of carrier in which a given amount of active ingredient is applied.

Ann. appl. Biol., 1948, 35: 84-93, bibl. 13.

The problem of whether a given amount of active ingredient is more effectively applied in concentrated or dilute form against insects in stored products is discussed.—Pest Infestation Laboratory, Slough, Bucks.

2255. KENT, W. G. 664.85 + 664.84

Fruit and vegetable storage.

Agriculture, Lond., 1948, 55: 78-80.

At a conference on fruit and vegetable storage held at Sittingbourne, Kent, in March, 1948, the following papers were read: (1) C. West, the gas storage of pears; (2) J. C. Fidler, apple and pear scald; (3) A. C. Hulme, the skin-coating of apples; (4) W. H. Smith, the storage of plums; (5) H. Wager, potato storage.

2256. HALL, E. G. 664.85.13.037

The cool storage of pears.

Agric. Gaz. N.S.W., 1948, 59: 77-81, bibl. 5.

Successful storage of pears depends on picking at the correct time, placing in storage without delay, cooling down quickly, maintenance of a uniform temperature of 29-30° F. during the cool storage period and removal of fruit at or before the first sign of overstorage. These points are elaborated. Overstored pears fail to ripen normally after removal to ripening temperatures; they begin to turn yellow and may develop scald while still at low temperature. To avoid overstorage pears should be removed while still hard and green to light green, and ripened after storage at 60° to 70° F., 65° being about the optimum.—N.S. Wales.

2257. SMOCK, R. M. 664.85.11.035.1

Some requirements of McIntosh apples in controlled atmosphere storage.

Proc. Amer. Soc. hort. Sci., 1947, 50: 109-14, bibl. 7.

The combination of 5% carbon dioxide and 2 to 3% oxygen at 40° F. still seems to be the optimum of all those studied. The controlled atmosphere store should be sealed as soon as possible. A delay of 1 month at 32° F. in air had a marked effect in lessening the value of controlled atmospheres. While controlled atmosphere storage may reduce decay on fruits with skin punctures, it will certainly not control it. The more rapidly the oxygen level drops in controlled atmosphere storage, the less will be the scald. Scald can be satisfactorily prevented in controlled atmosphere storage by means of air purification with activated coconut shell carbon. [From author's summary.]—Cornell Univ.

2258. SMOCK, R. M. 664.85.11: 632.19

The "spot" disease of Northern Spy apples.

Proc. Amer. Soc. hort. Sci., 1947, 50: 95-9, bibl. 2, illus.

This physiological disorder occurs in storage on the red part of the fruit, seldom on the yellow. A storage atmosphere of 5 or 10% CO₂ with 2% O₂ at 40° F. not only "controlled the trouble but added considerably to the storage life of the fruit".—Cornell Univ.

2259. McMAHON, M. L. 664.85.11

A comparison of various methods for reducing transpiration losses in apples.

Proc. Amer. Soc. hort. Sci., 1947, 50: 31-7, bibl. 14.

It is concluded from this general study that the wax emulsions used were the least effective of any group of materials tested. Stronger concentrations of solids in waxes, within the range examined, increased their efficiency. Heat-stretched ploifilm was the most effective wrapper. It was followed closely by .002 inch aluminium foil and a "50 gauge" ploifilm wrap. Aluminium foil of .002 in. was considered impractical as a wrapper owing to its heavy gauge. However, .00035 in. foil proved to be a very effective substitute. A box liner with lap-sealed corners was more effective than an open corner box; .002 inch aluminium foil was the best box liner material tested if the corners were sealed. If the corners were "open" then aluminium foil with a kraft backing was found to be the superior liner. A "light" (.00035 inch) gauge aluminium foil was found to be as effective as a heavy (.002 inch) gauge in controlling moisture losses. Little difference of commercial significance was found between the various celophanes tested. [From author's summary.]

STORAGE—PROCESSING AND PLANT PRODUCTS

2260. BLAHA, J. 664.85.72.037 Chladirenské uložení rybízu a angreštu se vztahem k odrůdě. (Varietal responses of currants and gooseberries to cold storage.) [Summary in English and Russian.] *Ann. Acad. tchécosl. Agric.*, 1946, 19: 340-6.

In the experiments described varieties showed great differences when stored at about 1° C. Black currants lost their commercial value if stored 12 days, but red and white varieties retained their quality and appearance after remaining 4 weeks in cold storage. Suitable varieties are mentioned. Owing to loss of moisture the dry matter and sugar content partly increased and saccharose decreased; the pectin remained constant while vitamin C varied greatly with the variety. Gooseberries are more suitable than currants for cold storage at 1° C., the best results being given by Farmer's Glory, Victoria and Whinham's Industry.

2261. BIALE, J. B. 664.85.653 Control of vapors in storage essential for prolonging life of avocados. *Yearb. Calif. Avocado Soc.* 1947, pp. 43, reprinted from *Calif. Agric.*

A short note on storage studies extending over 7 years. Respiration measurements afford an objective criterion for determining the effects of various storage treatments. The relationship between respiration and ripening is most striking in the avocado. When the fruit is placed at a constant temperature and under a constant rate of ventilation, the rate of CO₂ evolution first drops to a minimum, then increases sharply to a peak, followed by a marked decrease in respiratory activity. Fruit softening never occurred prior to the peak. From the nature of the CO₂ curve predictions could be made as to the date when the fruit would be ready to eat. Reducing the oxygen and increasing the CO₂ in the atmosphere of the store doubled and sometimes tripled the storage life of Fuerte avocados. The accumulation of ethylene gas during storage is briefly discussed.

2262. LUTZ, J. M., AND SIMONS, J. W. 633.492: 631.563 Storage of sweetpotatoes. *Fmrs' Bull. U.S. Dep. Agric.* 1442, 1948, pp. 50, illus.

A revised edition of a bulletin issued in 1925. The subject is dealt with under the following main heads: requirements for proper storage, curing and storing small lots, preparation for market, construction of store houses, suggested designs for new stores, conversion of existing buildings, structures for storing small quantities, storage in pits and cellars. It is recommended that the crop should be cured, immediately after harvest, at 85° F. for approximately 10 days at a relative humidity of 85% and stored at 50° to 55° F. at a R.H. of 80 to 85%. The illustrations are good.

Noted.

2263.

- a ANET, H. 634.1/7-1.564 Exposition suisse des emballages de fruits avec présentation des méthodes d'emballages et de manipulation des fruits. (Packing fruit in Switzerland.) *Rev. hort. suisse*, 1948, 21: 137-41.
- b ANON. 635.1/7: 631.563 Storing vegetables for winter use. *Ext. Circ. Me Coll. Agric.* 167 (revised), 1945, p. 1 [received 1948].
- c GANE, R. 581.192: 581.032 The water content of the seeds of peas, soybeans, linseed, grass, onion and carrot as a function of temperature and humidity of the atmosphere. *J. agric. Sci.*, 1948, 38: 81-3.
- d SMITH, M. B. 664.85.035.1 Gas-proofing of rooms used for refrigerated storage of fruit. *Food Pres. Quart.*, 1947, 7: 62-6, bibl. 10.

PROCESSING AND PLANT PRODUCTS.

(See also 2332, 2333.)

2264. PEYNAUD, E. 634.25: 577.16 L'acide ascorbique (vitamine C) dans les pêches. (Ascorbic acid in peaches.) *Rev. hort. Paris*, 1948, 120: 69-73, bibl. 9.

In 1947 the ascorbic acid content of ripe fruits of 70 varieties of peach ranged from 9 to 59 mg., with a mean value of 20 mg. per 100 g. flesh.

2265. PEYNAUD, E. 634.22: 577.16 L'acide ascorbique (vitamine C) dans les prunes. (The ascorbic acid content of plums.) *Rev. hort. Paris*, 1948, 120: 111-13, bibl. 2.

For 34 varieties analysed, the ascorbic acid content ranged between 3.5 and 23 mg. per 100 g. flesh. The average was 9.2 mg.

2266. PETROSI, G. 633.842: 577.16 Sopra il contenuto vitamínico dei vegetali: ricerche sui peperoni. (On the vitamin content of vegetables. Research on peppers.) [English summary 15 l.] Reprinted from *Quaderni Nuriz.*, 1948, 10: 3, pp. 30, bibl. 35.

Determinations of ascorbic acid were made on fruit of five varieties of pepper during three seasons, and of three others during two seasons. The varieties fell into three groups of which the most productive were richest in ascorbic acid. Vitamin content increases during the summer and decreases thereafter; to some extent it was increased by fertilizers.—University of Naples.

2267. LE RICHE, F. J. H. 635.34: 577.16 Studies on the processing of vegetables. Part IV. Studies on the ascorbic acid content of cabbage varieties.* *Sci. Bull. Dep. Agric. S. Afr.* 261, 1946, pp. 11, bibl. 27, being *Fruit Res. tech. Ser.* 11 [received 1948].

Sample size, sampling errors and titration errors involved in the determination of ascorbic acid in cabbage have been determined. Ascorbic acid is destroyed by oxidizing enzymes which are liberated by shredding or mincing; considerable loss may occur during cooking. The outer green leaves are rather richer in ascorbic acid than the inner leaves. Ascorbic acid is influenced by season and by manuring. Twenty-six varieties have been studied. [From author's summary.]

2268. VIDAL, V. A. C., AND NETTO, I. d'O. C. C. 634.14: 581.192 Estudo químico acerca dos frutos da *Cydonia oblonga* Pers. (A chemical study of quince fruits.) *Rev. agron. Lisboa*, 1944, 32: 1: 59-64 [received 1948].

The results of chemical analyses of quinces and of quince marmalade are tabulated, and from them it is suggested that the marmalade on the market should contain not more

* For Part I, see Burger, I. J., and le Riche, F. J. H., *ibid.*, 253, 1946; *H.A.*, 17: 1767.

PROCESSING AND PLANT PRODUCTS

than 35% water, that at least 40% should be fruit, and that the total sugar should not be less than 55%.
2269. SCHWARTZ, C. D. 634.1/8: 664.85.037
 Fruit variety problems of the frozen foods industry.
Fruit Prod. J., 1948, 27: 237-41.
 Comparatively few varieties of fruit are suitable for quick freezing, and these can be improved by co-operation between plant breeder and food technologist. The high cost of growing varieties suitable for freezing is analysed; the factors responsible include pests, diseases, fertilizers and cultural costs.

2270. JOSLYN, M. A., AND HOHL, L. A. 664.85.7.037
 The commercial freezing of fruit products.
Bull. Calif. agric. Exp. Stat. 703, 1948, pp. 108, bibl. 167 + 55, illus.
 This bulletin was prepared for the commercial processor; the principles of the process are described. The various temperate fruits are considered in detail; suitable varieties and appropriate methods are given. Certain tropical and subtropical fruits, and various fruit products, juices and purées, are also discussed. The bibliography is supplemented by additional lists of general reference books, journals, etc.

2271. BAMBERGER, J. 664.84/85.037
 Ou en est l'industrie de la congélation ultra-rapide en France? (What is the state of the quick-freeze industry in France?)
C.R. Acad. Agric. Fr., 1948, 34: 270-3.
 An historical survey of the development of the quick-freeze industry in France and an account of the constitution of the F.I.C.U.R. (Fédération interprofessionnelle de la congélation ultra-rapide). Twenty factories are already equipped, and the author considers that in the near future there will be a thousand cold chambers equipped for a temperature of -18° C.

2272. PIETTRE, M. 664.84/85.037
 La congélation rapide, nouvelle branche de la conserverie française. Présentation de quelques échantillons de denrées "commodities". (Quick freezing, a new method for preservation in France. Specimen products.)
C.R. Acad. Agric. Fr., 1948, 34: 267-9.
 This note, which is an introduction to one by J. Bamberger (see above), discusses the advantages of quick freezing for preserving fruits, vegetables and other perishable foods, and the development of the process in France.

2273. MACARTHUR, M. 664.84.31.037
 The effect of method of freezing, type of pack and storage on asparagus tissue.
Sci. Agric., 1948, 28: 166-74, bibl. 4, being
Contr. Div. Hort. Exp. Farms Serv. Ottawa 673.
 Tissue of asparagus requiring from under 2 minutes to 12 hours for freezing was examined after freezing and after storage periods. Very rapid freezing caused little tissue rupture. In brine and dry packs frozen at the same temperature, the brine packs required a shorter interval for freezing but the tissue had larger ice-filled lacunae. Increase of tissue rupture occurred with the addition of chilled solutions to the frozen product and generally the size of the lacunae increased with storage. [Author's summary.]

2274. VAN BLARICOM, L. O. 664.85.25.036.5
 Effect of syrup density on the flavor rating of canned peaches.
Proc. Amer. Soc. hort. Sci., 1947, 50: 229-30.
 The judging of flavour in canned peaches "has never been entirely satisfactory": sweetness influences judgment considerably. Figures are shown which indicate that if canned peaches, or other fruits, are to be judged on flavour, the sugar content of samples should be uniform.

2275. SKEPPER, A. H. 664.37.047
 The drying of figs.
Agric. Gaz. N.S.W., 1948, 59: 72-3, 92.
 In New South Wales the white varieties of fig, Smyrna and White Adriatic, are usually grown for drying. White Adriatic figs should be caprifred. Notes are given on harvesting, sulphuring, handling fruit on trays and packing.

2276. NATARAJAN, C. P., CHARI, C. N., AND MRAK, E. M. 664.85.37.047
 Yeast population in figs during drying.
Fruit Prod. J., 1948, 27: 242-3, 267, bibl. 10.
 In unfavourable weather yeasts may increase on figs being sun-dried. Dehydration at 130° F. greatly reduces the yeast population in a few hours; spoilage is reduced by this method.—University of California.

2277. CASS, W. G. 634.62 + 664.85.62
 Dates and date products.
Food, 1948, 17: 168, bibl. 2.
 A summary of recent developments in processing dates in Tunisia. Dehydration is being tried instead of sun-drying. Date-honey, containing 65.5% total sugars, is prepared from dates that are difficult to clean, by extraction, filtration and vacuum concentration.

2278. PIETTRE, M., ULRICH, R., AND LAFOND, J. 664.85.22.047
 La déshydratation et le réhydratation des pruneaux en atmosphères plus ou moins humides. (Dehydration and rehydration of prunes in atmospheres more or less humid.)
C.R. Acad. Agric. Fr., 1948, 34: 204-7.
 A study of the conditions (temperature and relative air humidity) favourable for the successful preservation of dried prunes.

2279. MRAK, E. M., AND PERRY, R. L. 664.85.25.047
 Dehydrating freestone peaches.
Circ. Calif. agric. Exp. Stat. 381, 1948, pp. 11, illus.
 Five alternative arrangements for dehydrating freestone peaches are described. In the simplest process the cut fruit is treated with SO₂ and dried in a counterflow dehydrator. Variations involve blanching, in batches or continuously, followed by preliminary drying in a parallel-flow dehydrator, before sulphuring.

2280. ESSELEN, W. B., JR., RASMUSSEN, C. L., AND FELLERS, C. R. 664.85.11.047
 Prepared fresh McIntosh apple slices.
Fruit Prod. J., 1948, 27: 276-9, bibl. 4, illus., being
Contr. Mass. agric. Exp. Stat. 650.
 A report of experiments to prevent discolouration, spoilage and loss in quality of slices of McIntosh apples during a few days' storage. Slices dipped in a solution of SO₂, (1,500 p.p.m.) for 10 minutes kept well for 1 or 2 weeks at 70° to 75° F., and 3 weeks or more at 35° F.; but they lost some liquid after a week. Dipping in a solution of 5% salt, 0.5% ascorbic acid and 0.4% citric or orthophosphoric acid was less effective.

2281. PHAFF, H. J., AND MRAK, E. M. 664.85.047
 Sulfur-house operation.
Circ. Calif. agric. Exp. Stat. 382, 1948, pp. 10, illus.
 A review of the operations involved in the treatment of fruit with SO₂, written for the grower who processes fruit on a small scale. The main causes of faulty sulphuring are clearly indicated.

2282. LÜTHI, H. 663.813
 Ein neues Süßmostfass für die Kleinpraxis. (A new fruit juice container for small-scale producers.)
Schweiz. Z. Obst- u. Weinb., 1948, 57: 157-8.
 The aluminium fruit juice container with a protective synthetic resin varnish, discussed *ibid.*, 1947, 56: 369-70 (H.A., 18: 726), has proved so satisfactory in further trials

PROCESSING AND PLANT PRODUCTS

that it is now going into mass production. The container is illustrated.

2283. GANE, R. 663.813+663.3
Concentration by freezing of fruit juices, vinegars, and ciders.

Food Manuf., 1948, 23: 282-7, bibl. 3.

Tables are given showing the properties of various fruit juices, vinegars, cider and stout concentrated to different degrees by freezing. Excessive concentration often leads to the separation of solids which do not dissolve when the concentrate is diluted.—Low Temperature Research Station, Cambridge.

2284. MARSHALL, R. E. 663.813:634.11
Control of quality in processed apple juice.

Fruit Prod. J., 1948, 27: 280-1, 299, 301, bibl. 12.

The following are the essential points in the production of apple juice of high quality: material—a blend of sound, ripe fruit yielding a juice of at least 12° Brix; processing—flash pasteurization at 170° to 175° F. through stainless steel equipment; storage—in glass or juice-enamel cans at temperatures below 50° F., after rapid cooling to 90° to 100° F. Fortification with ascorbic acid is beneficial but uneconomic; juice should be de-aerated before fortification.

2285. CHALLINOR, S. W., KIESER, M. E., AND POLLARD, A. 663.813:634.11

Effect of ion-exchange treatment on the stability of apple juice.

Nature, 1948, 161: 1023-5, bibl. 5.

A marked removal of cations accompanied by a corresponding increase in pH was effected in depectinized, pulp-filtered apple juice by passing the juice through laboratory columns of the Permutit ion-exchange "Zeo-Karb H 1". One passage through this adsorbent reduced the total ash in Blenheim Orange juice to 17.5% and the ash in Rival juice to 14.7% of the original values. A second passage of the latter juice through the regenerated column, after an intermediate treatment with De-Acidite to reduce acidity, further diminished the ash to 1%. The composition of Blenheim Orange and Rival juice, before and after treatment, is tabulated in respect of pH, total ash, and 6 cations. Microbiological tests, carried out after readjustment to the original pH, showed that the growth of yeasts was inhibited as the result of nutrient deficiencies. In a 4 weeks' storage trial the potential value of the ion-exchange treatment has been demonstrated. In the absence of aseptic precautions unpasteurized but ion-exchange treated Rival juice showed no obvious fermentation, while untreated juice was fermenting within 3 days. De-aerated juice bottled under CO₂ showed even greater stability. Further experiments are in progress. It is thought that the principle involved in the ion-exchange treatment—the removal of nutrients necessary for the growth of micro-organisms—may have far-reaching possibilities in the fruit products industry.—Dept. of Agric. and Hort., Bristol University, and Long Ashton Research Station.

2286. GROSSHOLZ, O. 663.813:634.8
Die Farbe des Traubensaftes. (The colour of grape juice.)

Schweiz. Z. Obst- u. Weinb., 1947, 56: 462-4.

The juice colour of blue-skinned grapes may be intensified by immersing muscatel or ordinary grapes in hot water (80° C.) for 3 and 15 seconds respectively. The pigments are thereby extracted from the skin. In Switzerland this method is applicable only to the manufacture of non-alcoholic grape juices.

2287. LÜTHI, H. 663.813

Versuche zur Konservierung von Obst- und Traubensaften mit einem neuen Mittel (Meilit). (The preservation of fruit and grape juices by means of a new preparation (Meilit).) [French summary 1 p.]

From reprint *Mitt. Geb. Lebensm. Unters. Hyg.*, 1946, 37: 378-95, bibl. 2 [received 1948].

The chemical preservation of fruit juices, if achieved, would be of great assistance to the small-scale and home producer. Tests at Wädenswil showed that the new preparation Meilit, at a concentration of 8 mg. per litre, inhibits the growth of micro-organisms, but only in juices that have already been clarified and filtered. The presence of the chemical at this concentration is noticeable to sensitive palates.

2288. SCHWARZ, H. W., AND PENN, F. E.

663.813:634.31

Production of orange juice concentrate and powder.

Industr. Engng Chem., 1948, 40: 938-44, bibl. 11.

The design and operational phases of a large-scale orange juice dehydration plant are described. Fresh orange juice concentrated to 50% solids at 10 mm. of mercury absolute is subsequently dried to a powder of 2% moisture at 0.5 mm. of mercury absolute or less.

2289. SCHROEDER, A. L., AND COTTON, R. H.

663.813:634.31

Dehydration of orange juice.

Industr. Engng Chem., 1948, 40: 803-7, bibl. 7.

The production rate of orange juice powder can be increased fivefold if 50% concentrate is dried instead of frozen whole juice. Drying from a liquid film doubles the production rate when compared to a frozen film. Removing the last traces of water is difficult. To minimize the effect of the falling rate period of drying, thin liquid films appear to be the logical approach. Temperature and moisture level have an appreciable effect on production rate. A final moisture of 1.5% is required for satisfactory storage. Because of the effect of temperature and time on initial taste it is recommended that 50° C. be the maximum temperature to which the produce is exposed. [From authors' summary.]

2290. HERRERO DE EGASA, M., AND REIG FELIU, A. 663.813:634.3

Primeras experiencias sobre la desaireación y pasteurización rápida de los jugos de agrios.

(The de-aeration and rapid pasteurization of citrus juices.) [Summary in French and English.]

Bol. Inst. nac. Invest. agron. for. Madr., 1947, No. 17, pp. 237-56, bibl. 31.

Experiments at the Estación Naranjera de Levante confirm results obtained in U.S.A. Pasteurization was carried out at 80° to 90° C. for 10 to 15 seconds, and the containers were filled at 70°-75° C. It is concluded that the pasteurized juices can be preserved without artificial freezing and will resist summer temperatures if not excessive. In certain regions the use of cellars with temperatures not exceeding 20° C. may be necessary. Of the citrus species cultivated in Spain the grapefruit is best for juice, the variety Duncan being more suitable than Marsh. With oranges the best results were given by Comuna and Cadenera de Alcira.

2291. DE FÁBREGUES Y SOLER, M., AND ESTALELLA AYXELÁ, T. 661.733.2

Contribución al estudio de la producción de ácido láctico por fermentación de los jugos de uva y de pataca. (Lactic acid obtained by fermenting the juices of grapes and Jerusalem artichoke.) [Summary in German, French and English.]

Bol. Inst. nac. Invest. agron. for. Madr., 1947, No. 17, pp. 125-64, bibl. 18.

Grape must and crude artichoke [*Helianthus tuberosus*] sap are suitable for the production of lactic acid, particularly the second because of its cheapness. The lactic fermentation is accelerated by adding a small quantity of nitrogenous matter, e.g. soybean flour or preferably a soybean extract. [In the summaries "pataca" is translated as potato.]

2292. PEYER, E. 634.8: 663.25
Weinlese und Weinherbst 1947. (Vintage 1947
in Switzerland.)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 419-24.

HUBER, H.
Vom grossen Weinjahr 1947. (The grand
vintage of 1947.)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 467-71.

While agriculture in general suffered severely from the drought, the 1947 vintage in Switzerland promises large quantities of an exceptionally good wine. Further data are given in Huber's article.

2293. RENTSCHLER, H. 663.25: 632.3
Über das Lindwerden der Weine und Obstweine.
(Oiliness, a disease of wine and fruit wine.)
Schweiz. Z. Obst- u. Weinb., 1948, **57**: 7-11,
bibl. 4.

The disease is caused by certain slime-producing organisms which, by their action on malic acid, increase the viscosity of the wine. Control measures are under investigation. The paper is concerned mainly with oiliness of grape wine.—Wädenswil Research Station.

2294. ORTEGA NIETO, J. M., AND ANDRÉS CANTERO, F. 634.63-1.56
Estudios preliminares sobre elaboración de aceites de oliva. (Preliminary studies of the extraction of olive oils.) [Summary in French.]
Bol. Inst. nac. Invest. agron. for. Madr., 1947,
No. 17, pp. 165-87.

The factors studied included: the degree of crushing, the temperature and compression during pressing, filter media and types of filters. The authors draw no definite conclusions but make suggestions for further tests.

2295. POLITZER, W. 633.526.23
Waxes from sisal waste.
Chem. Industr., 1948, pp. 408-9, bibl. 2.

Sisal waste contains a hard wax with properties resembling carnauba and candelilla waxes. This wax is contained mainly in the cuticle of the leaf. The yield of crude wax is estimated at 60-80 lb. per short ton of line fibre. The ideal type of waste for extracting wax is that obtained on carding flume-tow prepared for retting. This waste consists almost entirely of cuticle and contains about 17% waxes. It is estimated that 15 lb. of this waste would accumulate from each short ton of fresh leaf, from which 2 to 3 lb. of wax could be extracted. Benzene would be the most suitable solvent to use on a large scale. The properties of sisal waxes are discussed and their constants given.

Noted.

2296.

a ASENJO, C. F., AND DE FERNÁNDEZ, M. DEL C. C. 634.77
Uses, preparation, and properties of pinguinain, the protein-splitting enzyme of the Maya fruit [*Bromelia pinguin* L.]. [Spanish summary 5 1.]
J. Agric. Univ. Puerto Rico, 1945, **29**: 35-46,
bibl. 5 [received 1948].

b BURDICK, E. M., AND ALLEN, J. S. 634.3: 633.85
Rapid estimation of citrus peel oil, a new turbidimetric method.
Analyt. Chem., 1948, **20**: 539-41, bibl. 3.

c CALDWELL, J. S., AND OTHERS. 664.84.037
Comparative studies of varietal suitability for freezing preservation of peas, green or snap beans, lima beans, and sweet corn grown under eastern conditions.
Tech. Bull. U.S. Dep. Agric. **731**, 1940, pp. 72,
bibl. 59 [received 1948].

d CRUESS, W. V. 664.85.22
Investigations on prunes.
Fruit Prod. J., 1948, **27**: 230-6, bibl. 63.

e ESSELEN, W. B., JR., FELLERS, C. R., AND GUTOWSKA, M. S. 613.2: 634.11
Apples as food.
Bull. Mass. agric. Exp. Stat. **440**, 1947, pp. 32,
bibl. 79.

f EVANS, R. J., HENRY, J. L., AND ST. JOHN, J. L. 664.84.656.047
Peptization and precipitation of nitrogenous constituents of dry peas.
Industr. Engng Chem., 1948, **40**: 458-61, bibl. 17,
being *Sci. Pap. Wash. agric. Exp. Stat.* **690**.

g HYLMO, B. 664.8.036.5(485)
Jordbruk och konservindustri. (Agriculture and the canning industry in Sweden.)
Sver. pomol. Fören. Årsskr., 1947, **48**: 81-6.

h JONES, E. P. 633.913
Recovery of rubber latex from guayule shrub.
Industr. Engng Chem., 1948, **40**: 864-85, bibl. 13.

MACDOUGALL, D. 582.73
Effect of processing and storage on the quality of gelose from Irish moss (*Chondrus crispus*).
Canad. J. Res., 1948, **26**, Sec. F, pp. 160-7,
bibl. 8.

j MESTRE ARTIGAS, C., AND GARCIA BARCELÓ, J. 663.2
Perfeccionamiento de los métodos electroquímicos aplicables a los análisis de los vinos. (Improving electrochemical methods of analysing wines.) [Summary in German, English and French.]
Bol. Inst. nac. Invest. agron. for. Madr., 1947,
No. 16, pp. 101-24, illus.

k MRAK, E. M., AND PERRY, R. L. 664.85.22.047
Dehydrating prunes.
Circ. Calif. agric. Exp. Stat. **383**, 1948, pp. 11,
illus.
A guide chiefly for the small-scale processor.

l PEYER, E. 663.25(494)
Die Weinlesekontrolle und Weinbauberatung in den Rebgebieten der deutschsprachigen Schweiz. (Vintage supervision and advisory service in the vine growing areas of German-speaking Switzerland.)
Schweiz. Z. Obst- u. Weinb., 1948, **57**: 33-7, 63-6.

m RENTSCHLER, H., GUBELMANN, K., AND SIMMLER, H. 663.813: 634.13
Analysenzahlen sortenreiner, unvergorener Birmensäfte des Spitzjahrganges 1947. (Analytical figures for unfermented pure-variety pear juices of the peak year 1947 [in Switzerland].)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 475-7.

n SCHMID, A. 663.813
Rückspülbare Filteranlage. (A new fruit juice filter.)
Schweiz. Z. Obst- u. Weinb., 1948, **57**: 129-33.

o SHEARON, W. H., JR., AND BURDICK, E. M. 634.3-1.56
Citrus fruit processing.
Industr. Engng Chem., 1948, **40**: 370-8, bibl. 46.

p SONDHEIMER, E., AND KERTESZ, Z. I. 634.75: 581.175.11
Anthocyanin pigments—colorimetric determination in strawberries and strawberry products.
Analyt. Chem., 1948, **20**: 245-8, bibl. 9, being
J. Pap. N. York Stat. agric. Exp. Stat. **709**.

q THOMPSON, P. 664.84.35.036.5
 Canned broccoli, a study of the effects of various processing procedures on quality and ascorbic acid content.
Food Pres. Quart., 1947, 7: 74-8, bibl. 7.

r TUCKER, W. H., AND SHERWOOD, T. K. 664.84/85.047
 Vacuum dehydration using liquid absorbents.
Industr. Engng Chem., 1948, 40: 832-8, bibl. 8.
 A description of the method.

NOTES ON BOOKS AND REPORTS.

2297. AVERY, G. S., JR., AND JOHNSON, E. B., with the collaboration of ADDOMS, R. M., AND THOMSON, B. F. 577.17: 633/635

Hormones and horticulture.

McGraw-Hill, New York and London, 1947, pp. 326, £1 6s.

PEARSE, H. L. 577.17: 633/635

Growth substances and their practical importance in horticulture.

Tech. Comm. Commonwealth Bur. Hort. and Plant. Crops No. 20, 1948, pp. 233, bibl. 12s. 6d.

Those at all acquainted with the vast literature of plant hormones will welcome and appreciate the appearance of these two books, which aim at nothing less than the co-ordinated presentation of the widely-scattered experimental data relating to the practical horticultural uses of synthetic growth substances.

Professor Avery and his collaborators deal first with the use of hormones for rooting cuttings, and append a 70-page table of data showing successful root stimulation, and a 3-page table of plants reported not to respond. Then come chapters on blossom-thinning sprays, hormone control of pre-harvest drop, and parthenocarpic fruit production, followed by others on the hormone treatment of seeds—a rather controversial subject—, miscellaneous effects, hormonal herbicides, dormancy-breaking substances, inhibiting substances, with a final one on colchicine treatment. With each chapter there is a full list of references and an evaluation of the effects described. As is pointed out, the scope of the book is deliberately not confined to recognized hormonal effects, colchicine and certain of the dormancy-breaking and blossom-thinning substances being included because of the appropriate context.

Dr. Pearse is reviewing the hormone field for the second time, having done so nine years previously.* Pride of place again goes to root stimulation of cuttings, and there is an even larger table of results with numerous species. Then comes a section on the hormone treatment of seed and seedling, another on the treatment of growing plants, passing to parthenocarpy, hormonal herbicides, inhibition effects, and finally a section on miscellaneous uses of growth substances. Non-hormonal effects are not included, much less emphasis is placed on blossom-thinning sprays in consequence, and the hormone control of pre-harvest fruit drop is omitted as this subject has been treated in detail elsewhere.† The extensive bibliography is given altogether at the end of the book, but there is no index, a serious omission despite a full list of contents.

The two books may be regarded as serving somewhat different needs, *Hormones and Horticulture*, in the well-produced McGraw-Hill botanical science series with numerous illustrations, providing a most helpful textbook for students and horticulturists, while the Commonwealth Bureau publication is a much fuller exposition of the technical problems involved, and in particular Dr. Pearse is to be congratulated for his excellent treatment of the subject of root stimulation. Both books, however, provide extensive references to original work and much valuable tabulated data which will enable the reader to form his own

judgment in many of those cases where results are at variance. As an example one may quote the use of growth substances in aiding grafting and transplanting, where the two texts convey opposing impressions; one (Avery) that there is a definite effect of growth substances in facilitating graft-union but not in overcoming adverse transplanting effects; the other (Pearse) that it is the grafting effect which is doubtful, not the transplanting effect. As a source of instructional knowledge in the use of growth substances both books are a mine of information.

The severely practical approach to the subject of plant hormones has not wholly precluded reference to the more theoretical aspects of this great field of exploration. The authors of both publications appreciate the heavy but inevitable lopsidedness between fundamental studies and applied research, and recognize that the successful horticultural utilization of plant hormones depends ultimately on the elucidation of their physiological role in the metabolism of the plant. In the past the study of the coleoptile of the oat seedling paved the way to the discovery of the auxin group of plant hormones; who knows what the keys to other hormone groups will be!

E.S.J.H.

2298. BECKER-DILLINGEN, J. 635.1/7(43)

Handbuch des gesamten Gemüsebaues. (A manual on vegetable growing.)

P. Parey, Berlin, 1943, 4th edition, pp. 874, illus., bibl. 22, RM. 33.40 [received 1948].

The scope of this standard work of nearly 900 quarto pages and about 450 illustrations is indicated by its sub-title, which reads in translation "including vegetable seed production, spice plants and kitchen herbs. On a practical-scientific basis, with special reference to plant breeding". It is essentially a book for the practical man. Some of the latest developments, of course, could not be found in a book that was published in 1943, when the synthetic insecticides had not yet begun to revolutionize pest control. The author recommends the organized use of poultry to combat insect pests, suggesting that they should, if necessary, be transported daily to the scene. Damage to vegetable crops is stated to be insignificant. Writing in 1943, he does not mention hormone sprays in connexion with fruit setting in glasshouse tomatoes, but it seems strange that he makes no reference to deficiency diseases, although he does describe other physiological troubles. Another reason for surprise is that the continuous cloche method of growing early vegetables appears to be unknown in Germany. Bell jars are mentioned as "not unknown in certain areas". Instead, conical paper bags are recommended for the protection of young frost-susceptible crops in the field, such as cucumber, bean, lettuce, cauliflower, etc. When the critical period has passed, the bags are torn open at the top and the plants are gradually hardened. A further interesting suggestion, which may be mentioned in this connexion, is the erection of transparent wind screens consisting of rows of Dutch lights stood up vertically. The book offers clear instructions on every conceivable aspect of vegetable and herb production in the field, in the glasshouse and in frames. After sections devoted to vegetable growing in general (pp. 176) and seed production (pp. 28), the individual cultivation of 82 vegetables and herbs is described. The chapters on the more important vegetables, much the same as those grown in Great Britain, may almost be considered as a collection of monographs (e.g. cabbages pp. 90, beans [*Phaseolus*] pp. 47, cucumbers pp. 43). In each case the

* Pearse, H. L., *Plant hormones and their practical importance in horticulture*. Tech. Comm. imp. Bur. Hort. Plant. Crops 12, 1939, pp. 88, bibl. 248, 3s. 6d.

† Vyvyan, M. C., *Fruit fall and its control by synthetic growth substances*. Tech. Comm. imp. Bur. Horticulture 18, 1946, pp. 73, bibl. 115, 3s. 6d.

cultivation of the particular vegetable is followed by paragraphs on the following subjects: Translation of its name into 17 languages—most useful to those who struggle habitually with foreign literature on horticulture—, origin, botanical description, chemical composition, varieties, seed production, breeding, diseases and pests. The author encourages the seed grower to do his own selection and hybridization work by discussing fully for each crop the improvement to be aimed at and the methods to be used in selection and breeding. The growing of seeds of each vegetable is also treated in detail, the sunny and dry climate of several districts in Germany offering excellent opportunities for large-scale seed production. It is to be hoped that this valuable manual will be kept up to date by new editions.

2299. VAN CAUWENBERGHE, E. 634.22
Monographie et standardisation des prunes: culture du prunier. (Monograph on plums, varieties, cultivation and handling.)

Vilvorde, 1942, pp. 263, illus., 55 fr. b.

Descriptions are given of 52 commercial plum varieties; in several cases the results of controlled pollinations are given, and in other cases foreign work on pollination is quoted. Synonyms are often discussed at some length, and the origin of the variety is recorded, if known. Grading, packing, storage and marketing are described. The section on cultivation deals with stocks, pollination, the control of pests and diseases, and with orchard heating against spring frosts.

2300. VAN CAUWENBERGHE, E. 634.23
Les cerises, monographie, standardisation et culture. (Monograph on cherries, varieties, cultivation and handling.)

Vilvorde, 1946, pp. 307, illus.

In the pomological section of this work descriptions and diagrams of some fifty cherry varieties appear; for many the results of controlled pollinations at Vilvorde are reported. The problems of origin and synonymy have received special attention. The distribution of the different varieties in Belgium is reported. In the section on packing and marketing, reference is made to the standard commercial varieties of England, Germany, Holland and France; and details of the equipment necessary for picking and packing are given. The classified rootstocks are described comparatively. Planting systems are discussed with reference to the pollination requirements of the varieties chosen. Other topics treated include pruning, manuring, pests, diseases and spring frosts.

2301. VAN CAUWENBERGHE, E. 631.541.11: 634.1/2
Sujets porte-greffes pour arbres fruitiers. (Stocks for fruit trees.)

Vilvorde, 1946, 2nd edition, pp. 416, illus., 50 fr. b.

After introducing his subject, Professor van Cauwenbergh describes the work of Hatton at East Malling and of Sprenger at Wageningen in sorting out the confusion that existed among the apple rootstocks in use thirty years ago, work that led to the general adoption of the E.M. classification. Specimens of the Malling stocks were established at the State Horticultural School, Vilvorde, in 1928, and grafted plants were set out in 1930.

These stocks, Northern Spy, and four of the Merton stocks are described comparatively as regards morphological and physiological characters, disease resistance, influence on scion and use; drawings of their fruits facilitate identification.

The early results of two non-statistical stock-scion variety trials, set out in numerous tables and diagrams, are described in some detail and their implications for the future of fruit-growing in Belgium are discussed. At first sight this form of presentation may seem a little unusual; but there is much to commend it, both to the local grower, for whom it gives a readable annotated account of the efforts of his research

establishment, and also to the foreign scientist, who is thereby enabled to make some comparison with his own work. Quince stocks for pears, and the various stocks for plums and peaches are also described and the results of variety trials, including one with Hale's Early peaches under glass, are discussed. Descriptions are given of the cherry stocks being studied, but no trials are reported.

In the final chapter the technique of vegetative propagation by cuttings and in stool beds is described. When growers began to appreciate the value of classified stocks, demands rapidly exceeded the supply from the propagation beds at Vilvorde. Belgian nurserymen are not accustomed to propagate stocks, which they had customarily imported in the past; the author suggests that a few of them should concentrate on multiplication, preferably under strict official control, to provide authentic stocks for grafting by their colleagues.

Throughout the book there are frequent references to similar work in other countries.

2302. CHOUARD, P., AND LAUMONNIER, E. [Editors]. 634/635(03)

Le bon jardinier.

La Maison Rustique, Paris, 151st edition, 1947, pp. 1,864, illus., bibl. numerous in text, fr. 2,400.

This comprehensive encyclopedia bears little resemblance to the first of its line, published in 1775 and "containing a general idea of four sorts of gardens, rules for cultivating them and the method of raising the best flowers". The total page area has increased nearly seventy fold and there are now 95 contributors. The subject matter seems to cover the range of human knowledge of applied horticulture in metropolitan France and in the tropics; there are numerous articles on specific aspects of horticulture, and the general alphabetical index of ornamentals (pp. 1,195-1,838) gives such details as the chromosome number when this is known. Recent discoveries which are discussed in their practical applications include DDT, 666, and the synthetic growth substances. The value of the work is greatly enhanced by the very frequent insertion of references, both specific in the text and general at the end of each section. The editors have earned the gratitude of student and practising horticulturist at home and abroad.

2303. GRAM, E., AND BOVIE, P. 635.1: 632.3/8

Rodfrugternes Sygdomme og Skadedyr. (Diseases and pests of root crops.) [English text to plates and figures pp. 10½.]

Det Danske Forlag, Copenhagen, 2nd edition, 1944, pp. 125 + 48 coloured plates.

GRAM, E. 633.491-2.3/8

Kartoflens Sygdomme i Billeder og Tekst. (Potato diseases and pests illustrated and described.)

[English text to plates and figures pp. 7.]

Det Danske Forlag og L. H. S. Forlag, Copenhagen, 2nd edition, 1945, pp. 108 + 24 coloured plates.

Both books were prepared by the Danish State Experiment Station for Plant Diseases and Pests and published by the Royal Danish Agricultural Society. Their outstanding feature is the large number and high quality of coloured plates illustrating the symptoms on the plant of both physiological and pathogenic diseases and pests. The larger insect pests, recognizable to the naked eye, are also illustrated. Obviously, the author and painter had agriculturists in mind as their public and not scientists. The full explanation of plates and figures in English, enclosed as a special leaflet, adds to the value of the two books for non-Scandinavian readers.

2304. JESSEN, K. F. W. 58

Botanik der Gegenwart und Vorzeit. (Botany present and past.)

F. A. Brockhaus, Leipzig, 1864. Republished by the Chronica Botanica Co., Waltham, Mass., U.S.A., 1948, pp. xviii + 495, \$6.00.

This is Volume I of the Pallas series—A Collection of Offset Reprints of out-of-print and classic scientific works, edited by Franz Verdoorn for the Chronica Botanica Co. It is a history of botany and botanical thought from the earliest recorded times to the middle of the nineteenth century.

2305. KOTTE, W. 635.1/7: 632.3/8
Krankheiten und Schädlinge im Gemüsebau und ihre Bekämpfung. (Vegetable diseases and pests and their control.)
 Paul Parey, Berlin, 1944, pp. 244, illus. [received 1948].

A short chapter on the significance of plant protection in vegetable cultivation is followed by one which gives a general account of the pests and diseases concerned. The diseases and pests which affect a number of vegetable crops are described and then those of individual crops, with notes on symptoms and control measures. Next comes a chapter on general control measures, and in it are discussed biological control, soil sterilization, seed disinfection, spraying and dusting, fumigation, baits, and machines for applying fungicides and insecticides. There is a monthly calendar of operations and a key for the recognition of the pests and diseases of the individual crops. The book is well illustrated with 169 text figures from photographs and 8 coloured plates.

2306. MITCHELL, R. L. 535.33: 581.192 + 631.416
The spectrographic analysis of soil, plants, and related materials.
Tech. Commun. Bur. Soil Sci. Harpenden 44, 1948, pp. 183.*

2307. SCHARRER, K. 631.811.9
Biochemie der Spurenelemente. (Biochemistry of trace elements.)
 Paul Parey, Berlin, 2nd edition, 1942 [received 1948], bibl. 112, pp. 319, RM. 25.60.

The author of this book goes into greater detail than Stiles in his *Trace Elements in Plants and Animals*, (see H.A., 16: 2313). He discusses very fully results available up to 1939 and supplies a tremendous list of references for separate, including rarer, trace elements. Provided the buyer realizes that he will find no references to the important work done in the last ten years, such as that on zinc and manganese, he should be well satisfied with his purchase of a very valuable work.

2308. SORAUER, P. [Editor, O. Appel]. 632.9
Handbuch der Pflanzenkrankheiten. Bd VI, 2.
Halbbd. (Handbook of plant diseases. Vol. VI, part 2.)
 Paul Parey, Berlin, 1941, 732 pp., bibl. 28 pp., illus. [received 1948].

This, the second half-volume (the first appeared in 1939) of Vol. VI of Sorauer's text-book of plant diseases, continues with plant protection and the control of plant diseases, along the following lines: biological control, disinfectants, spraying and dusting machines, the use of aeroplanes, fumigation, atomizing and flame-throwing devices, seed testing, resistant varieties, importation and quarantine regulations, the organization of plant protection and plant disease literature.

2309. THIMAN, K. V., AND BEHNKE, J. 577.17: 631.535
The use of auxins in the rooting of woody cuttings.
Publ. Maria Moors Cabot Foundation 1, 1947, pp. 272, bibl. 291, \$1.00.

The number of papers dealing with this subject has now reached such alarming proportions that the authors deserve congratulation for their massive table of data on the rooting of cuttings with and without auxin treatment. By using simple abbreviations they have contrived to compress into some 240 pages the salient features of many thousands of experiments, either reported in the literature or unpublished. The material is arranged alphabetically by scientific name

* This publication will be reviewed in H.A., Vol. 18, No. 4.

(and by horticultural variety, when this is reported). Details recorded include type of cutting, season, growth substance, scale, duration, nature of control, and results. Notes of special points, such as rooting medium or the use of mist, are added. This compilation will have added interest for those who work with plantation crops, for many trials with tropical crops are included. Propagators everywhere will find useful guidance when starting work with untried material.

2310. ARKANSAS. 634/635(767)
Fifty-seventh Annual Report Arkansas Experiment Station for years ending 30 June 1945 and 30 June 1946, pp. 23 [received 1948].

A popular report from which the following items are selected. A winter cover-crop of hairy vetch, followed by crotalaria in the summer, provides enough organic matter and nitrogen to carry 2 or 3 succeeding cultivated crops. Sweet potatoes grown in soil deficient in nitrogen and phosphorus and without fertilizer were low in carotene. Promising results are reported from tomato selections of the cross, Pan-America × Rutgers. Strains of high-quality watermelons, resistant to wilt, are being developed. Fermate has proved to be the most useful substitute for bordeaux mixture on tomatoes. Both ascorbic acid and ascorbic plus citric acid retarded, or prevented, discoloration of packed and frozen peaches when thawed after storage.

2311. BIOLOGISCHE ZENTRALANSTALT FÜR LAND-U. FORSTWIRTSCHAFT. 632.9
Nachrichtenblatt für den Deutschen Pflanzenschutzdienst, 1947, Vol. 1, new series, pp. 148.

Volume 1 of the new series is Vol. 27 of the whole series, publication of which broke down in 1945. The journal remains the organ of the Biologische Zentralanstalt für Land-u. Forstwirtschaft, Berlin-Dahlem, and of its branches all over Germany. It is intended to enlarge the size of individual numbers, which will appear monthly.

2312. BRITISH COLUMBIA. 63(71.1)
Forty-second Annual Report of the Department of Agriculture, B.C., 1947, 1948, pp. 189.

The following items are taken from the report of the Horticultural Branch by W. H. Robertson, pp. 60-86: *Deblossom sprays:* A 5-year test was completed of dinitro-orthocresol and dinitro-cyclo-hexylphenol sprays as thinning agents for apples at pre-blossom and blossom stages. Results indicate that these chemicals cannot generally be recommended to growers for crop thinning, though the method would be of value to growers with large blocks of Duchess or Wealthy apples. *Weed control:* Successful trials with Vassol (a refined oil similar to cleaning-solvent) for controlling weeds in carrots are reported. The quantity of oil used varied from 16 to 55 gal. per acre, the cost of the oil being 37 cents per gal. It is expected that Vassol, Stoddart solvent, or stove-oil of the proper specification will come into general use for the control of weeds in young carrots. *Codling moth:* Both DDT and DDT + xanthone gave excellent results in controlling codling moth. *European red mite:* Excellent control was obtained with sprays of (1) DDT, dinitro-cyclohexylphenol, monoethanolamine, and (2) Hexaphos. *Mulching:* The successful use of sawdust for mulching strawberries and loganberries is reported.

2313. BRITISH COLUMBIA. 31(711): 634 + 635
Agricultural Statistics Report, 1946, Dep. Agric., B.C., pp. 42 [received 1948].

Includes figures showing vegetable and fruit production for 1943-46.

2314. CEYLON COCONUT RESEARCH SCHEME. 634.61(548.7)
Annual Report of the Coconut Research Scheme for 1944 and 1945, being Sessional Paps. Ceylon I and VIII, 1948, pp. 20 and 18, 40 and 35 cents.

NOTES ON BOOKS AND REPORTS

Work is reported on: analysis of coconut water [milk] and the nature of the sugars found, the composition of the coconut apple, dry distillation of coconut shell, coconut-shell tar, alkaline oxidation of shell, yields of mother palms and selected seedlings including dwarf Philippine types, distribution of flowering and spathes in 6 classes of seedlings, catch-crops including pineapples, manurial experiments with NPK, influence of manuring on the development and setting of female flowers and on copra out-turn, cover-crop experiments, analysis of dry-milled coir-fibre dust, the study of available phosphorus in the soils from manurial experiments.

2315. CEYLON, TEA RESEARCH INSTITUTE. 633.72(548.7)

Annual Report of the Tea Research Institute of Ceylon for 1946, being Bull. 28, pp. 62 [received 1948].

Blister-blight of tea arrived in Ceylon at the end of 1946, causing considerable concern. The position up to early 1947 is reviewed. Entomological work was largely concerned with research into the shot-hole borer, which was reared for the first time, from egg to adult, outside its galleries. In a discussion on the C and N status of Ceylon soils evidence is produced to show that the use of artificial manures does not exhaust the soil of its N or its organic matter. Accumulated data regarding the potash requirements of tea indicate that applications of potash cannot be dispensed with, even though Ceylon soils are relatively rich in K. Plant selection work continued and may eventually prove to be the solution of the blister-blight problem. Chemical investigations in London, jointly financed by Ceylon, India and the Netherlands, were resumed. These investigations have been extended to the green leaf. On the manufacturing side interest was centred chiefly on the development of epicyclic rolling (cone or column rolling), which offers certain advantages and reduces the cost of manufacture, if properly carried out.

2316. COLORADO. 63(788)

Fifty-ninth Annual Report of the Colorado Agricultural Experiment Station, 1 July 1945 to 30 June 1946, 1946, pp. 21, illus. [received 1948].

In the brief section on fruit, work on peach mosaic is reported; new forms of the disease are being isolated in connexion with studies of immunity. Ferrous sulphate placed in holes drilled round the roots of peach trees alleviated chlorosis. Biennial sweet clover is recommended as a cover crop for apples. Fruit rot of tomatoes can be controlled by ridging, proper spacing, and appropriate irrigation with water to which copper sulphate has been added. Weed-killers based on 2,4-D have been widely tested; the use of electric current on bindweed and Russian knapweed shows limited value.

2317. COLORADO. 63(788)

Sixtieth Annual Report of the Colorado Agricultural Experiment Station, 1 July 1946 to 30 June 1947, 1947, pp. 37.

For the control of codling moth on apples DDT is far superior to lead arsenate; two cover sprays against the first and second brood of worms appeared to be adequate, and sulphur may be added for mite control without affecting the efficiency of the DDT. Fertilizer tests on peaches show that N increased yields but delayed maturity, while P hastened ripening; cover crops and cultural practices, however, should remain the bases of maintained fertility. Mention is made of work on the recognition of virus diseases in potato tubers, and the results of experiments to control potato pests are outlined.

2318. COMMONWEALTH ECONOMIC COMMITTEE. 633.6 + 633.7 + 633.8 + 633.91: 31

Plantation crops.

H.M.S.O., London, 1948, pp. 102, 5s.

This review of world production of and trade in sugar, tea,

coffee, cocoa, spices, tobacco and rubber covers the period 1937 to 1946, with special reference to the part played by the British Commonwealth. The effects of the war are analysed. Some figures concerning the production of synthetic rubber are given. The last volume in this series appeared in 1938.

2319. PETERSEN, H. I. (DANISH INSTITUTE FOR WEED RESEARCH). 632.5

Aarsoversigt for Statens Ukrudtsforsøg. Fra 1. April 1946 til 31 Marts 1947. (Annual Report of the Danish institute for weed research, 1st April, 1946-31st March, 1947.) [English summary 1½ pp.]

Tidsskr. Planteavl., 1947, 51: 545-50.

The institute was established on 1st April, 1946. Activities include the testing of weed killers, the spreading of information, and a study of the distribution and significance of certain weeds in different parts of Denmark.

2320. STAHL, C. (DANISH SEED TESTING STATION). 631.3

Beretning fra Statsfrøkontrollen for det 75 Arbejdsaar fra 1. Juli 1945 til 30. Juni 1946. (75th Annual Report of the Danish State Seed Testing Station for the year 1st July, 1945, to 30th June, 1946.) [English summary 2½ pp.]

Tidsskr. Planteavl., 1947, 51: 189-246.

Thirty-nine Danish firms have submitted voluntarily to a check of their sealed seed packets by the State Seed Testing Station. According to the agreement, the firms are obliged to compensate their customers if their seed does not come up to the guaranteed standard of purity, germination and freedom from weeds. Detailed records give a survey of the Station's work.

2321. I.N.E.A.C. 633/635(675)

Rapport annuel pour l'exercice 1946. (Report on experimental work of I.N.E.A.C. stations, 1946.)

Institut national pour l'étude agronomique du Congo belge, Brussels, 1948, pp. 184, 70 fr.

New sections in this report describe activities at Keyberg, where temperate tree fruits are being grown, and at the Station de Sériculture et d'Apiculture at Mont Hawa. *Oil palm*.—Diseases of the spear, trunk and roots are described. At Barumba new plantations are being set out on the contour, and the extra labour necessary for this method of planting is indicated. At Kondo the size of planting hole, which ranged from 40 cm. to 80 cm., has not affected yield; the early yields of some hybrids bred at Yangambi are given. *Rubber*.—Experiments on spacing and tapping systems are described. Considerable differences in susceptibility to wind damage exist among the clones in cultivation at Bongabo; a pure stand of Tj. 1, the most susceptible clone, was more damaged than a mixture of Tj. 1 and AV. 49. To study the influence of stocks on scions with regard to growth, yield and uniformity, Tj. 16, M. 8, AV. 49 and BD. 5 were budded on unselected and clonal [seedling ?] stocks. *Cacao*.—Notes are given of experiments on breeding and planting. 300,000 seeds were issued for plantations. *Coffee*.—Various cultural experiments are described; the yields of the more promising F₁ generations are given. *Cinchona*.—Notes are given on selection and breeding; the grafting technique has been improved. *Pyrethrum*.—Seed gardens have been established with clones rich in pyrethrins.

2322. JOHN INNES. 634/5

Thirty-eighth Annual Report of the John Innes Horticultural Institution 1947, Merton and Hertford, 1948, pp. 38.

Glasshouses at Bayfordbury.—The eight houses are designed to evaluate orientation, design, materials and cultivation. Wood, steel, and aluminium are each being used as framework materials with different sized panes of glass, and English designs will be compared with others used overseas.

NOTES ON BOOKS AND REPORTS

Low pressure steam from oil-fired boilers will be used for heating. The aim is to make a fundamental investigation of glasshouse design. Other developments at Bayfordbury are described. *Pomology Department*.—Pear seedlings free from scab only occurred among offspring of Conference or Beurré Giffard in the plantation at Long Sutton, where scab, *Venturia pyrina*, was rampant. Methods of producing hybrid seed of raspberries are being investigated. Tomato seeds of Ailsa Craig and probably other varieties should be germinated at 55–60° F. under the best possible light to reduce the production of rogues. In the study of X-ray-induced mutations in *Oenothera* the use of β-naphthoxyacetic acid enabled capsules with solitary seeds to mature. Selection of haricot beans is intended to produce an early strain suitable for mechanical harvesting. Three apple seedlings have been named: Merton Worcester (Cox's Orange × Worcester Pearmain); Merton Prolific (Northern Greening × Cox's Orange); and Merton Pippin (Cox's Orange × Sturmer Pippin). A new tomato, Puck, has been released; it combines the desirable characters of dwarf and bush types. *Genetics Department*.—Progress in the improvement of tomatoes and beans is described. The John Innes Selection of dwarf bean did well when harvested green or for haricots. *Garden Department*.—Tomato seedlings, pricked out early into 3½-in. pots and given 6 hours artificial light (500 f.c. from daylight fluorescent tubes) for the first 20 nights after germination, produced three times as much fruit in the first three weeks of harvesting as did spaced-sown seedlings grown without artificial light. The effect of extra light persisted, in a small degree. Experiments with winter lettuces indicate that seed should be sown in JIS* compost, the seedlings pricked out immediately after germination into JIP₂* compost and planted out in the first leaf stage. Two new forms of *Streptocarpus* have been released.

2323. KENYA. 633/635(676)
Annual Report of Kenya Department of Agriculture for 1946, Parts I, II and III, 1948, pp. 218, S. 5.

Part III of this volume includes sectional reports on experimental work from which the following items are selected: *Pyrethrum*: The selection of high toxic strains continued. Twenty-six trials were laid down to obtain information on cultural practices. A new disease caused by *Ramularia bellunensis* was reported (see H.A., 17: 2564). Chemical investigations were largely concerned with attempts to correlate the methods used for analysing pyrethrum in East Africa and the U.S.A. *Coffee*: In pruning experiments, after stumping, multiple stem and single (2 stem) systems produced the greatest yield in the first crop. In shade experiments at Kiambu the unshaded plots produced the highest yields, but of lower quality coffee. Investigations into root systems of shade trees indicated that *Maesopsis eminii* and *Erythrina tomentosa* may be suitable shade trees for coffee. Investigations into soil moisture measurements (using the electrical resistance, Bouyoucos block method), coffee quality, flower bud development and growth observations are reported. *Sisal*: Investigations into the recovery of valuable acids from the effluent of sisal decorticators were begun. *Potatoes*: The testing of imported blight-resistant varieties continued. Of these these have proved suitable for Kenya: 914a (91), 835a (3) and Salaman Clarke 2. *Fruit*: Research is urgently needed into (1) the prolonged dormancy of deciduous fruit trees in the tropics caused by insufficient chilling and (2) suitable rootstocks for deciduous fruits and citrus. Brief mention is made of the following Malling apple rootstocks which have proved "more promising": Malling Immune Nos. 10, 11 and 411, Malling XIII. *Vegetable seed production*: This new industry in the highlands continued to develop, largely as a result of wartime experimental work. [The inclusion of a contents page would have greatly facilitated access to the various sections of this long report.]

* JI=John Innes.

2324. MACAULAY INSTITUTE. 634/635
Annual Report of the Macaulay Institute for Soil Research 1946–47, Aberdeen, 1948, pp. 28. The work of the Plant Physiology Department is outlined; potatoes, tomatoes and strawberries are among the crops whose nutrition is being investigated. Raspberries, other fruit crops and bracken are to be investigated along the same lines. "Special prominence has been, and will be given to the fundamental aspects of magnesium deficiency, to the effect of ion antagonism on absorption, to the effect of nutrient supply on the translocation of nutrients within the plant, and to the relationships between soil treatment, yield, plant composition and disease resistance." Methods for determining the nutrient status of plants are being evolved; so far these cover N, P, K, Mg and Mn. Spectrographic work continues.

2325. MALAYA DEPARTMENT OF AGRICULTURE. 63(595)
Report on Agriculture in Malaya for the year 1946, pp. 85, \$1.50 or 3s. 6d. [received 1948].

Research: The divisional research reports (pp. 40–55) have been written so as to link the last report published in 1941 with conditions in 1946 when work was mainly devoted to re-establishing laboratories and field trials after a long period of enemy occupation. Progress was severely handicapped by lack of apparatus and equipment and by the shortage of senior staff.

2326. MASSACHUSETTS. 633/635(744)
Annual Report of Massachusetts Agricultural Experiment Station for year ending June 1947, pp. 72, being Bull. 441.

Pomology: Malling I and II are thought to be the most desirable rootstocks for commercial apple orchards where smaller trees are required. Malling VII is promising. Trees on Malling IX are excellent for home gardens. Work on lethal incompatibility between clonal stocks and apple varieties continued. The lethal factor, in one case, appears to be a virus. Inconclusive results are reported from the use of various sprays for thinning apples. A study of winter hardiness in raspberries suggested that a relationship exists between rest period and cold resistance. In trials of herbicides for use in orchards ammonium sulphamate again proved successful in eradicating poison ivy. This compound and also a proprietary sodium chlorate mixture were highly successful in killing twitch-grass. *Horticulture*: The industrial solvent Savasol No. 5 showed much promise as a herbicide in nurseries. *Olericulture*: Broccoli trials are reported. To avoid crossing with wild carrots, "elite" carrot seed was produced in greenhouses, using bees as pollinators. The advantage of using hybrid tomato seed was a crop increase in the early harvest of 25% over the yield of the parents, an advantage that diminished as the harvest progressed. *Botany*: The following are reported: experiments on vegetative propagation of woody plants as affected by soil treatment and modification of environment; the application of soil fungicides in fertilizers; the interrelation of wettable sulphur, lead arsenate and lime in apple spraying; tobacco frenching induced by high soil temperatures; resistance of potatoes to late blight. *Floriculture*: Sub-irrigation for carnations, sodium selenate for red spider control, rooting carnations in sub-irrigated sand and vermiculite.

2327. EASTMAN, M. G. (NEW HAMPSHIRE). 634/635(742)
Agricultural Research in New Hampshire. Annual Report New Hampshire Agricultural Experiment Station 1946/47, being Bull. N. Hamp. agric. Exp. Stat. 372, 1947, pp. 51.

Potatoes.—A wooden bin, used for storing culinary potatoes, was not sufficiently gas-tight to maintain the concentration of CO₂ necessary to inhibit sprouting. When Green Mountain potatoes infected with potato leaf roll virus are

NOTES ON BOOKS AND REPORTS

grown in the greenhouses during winter, high nitrogen in the soil may prevent the appearance of symptoms; the high N level and low light intensity seem to act by reducing starch accumulation in the leaves. **Fruit.**—Breeding work is in progress with strawberries, raspberries and peaches. **Ornamentals.**—Hardy chrysanthemums are being tested. **Vegetable breeding.**—High vitamin strains of tomato are being developed; these contain three times as much ascorbic acid as do commercial strains.

2328. PENINSULA HORTICULTURAL SOCIETY. 634/5(752)

Transactions of the Peninsula Horticultural Society, 1947, being Bull. St. Bd. Agric., Delaware, Vol. 37, No. 5, pp. 78.

Papers are included on the following topics: breeding strawberries for resistance to red stele; diagnosis of mineral requirements in orchards; the control of pests and diseases of fruit and vegetables; the relation of yield to quality in the production of vegetables for canning; chemical control of weeds in vegetables, sweet corn and strawberries.

2329. TRULLINGER, R. W. (PUERTO RICO).

633/635(729.5)

The Federal Experiment Station in Puerto Rico.
From Rep. Chief Office Exp. Stats., agric. Res. Administ., 1947, U.S.D.A., Washington, 1948, pp. 357-61.

Insecticidal crops: Work has been concerned primarily with developing the bases for evaluating insecticidal plant materials, the killing power of which cannot be based on rotenone alone. A simple and rapid method for testing derris and lonchocarpus roots, using guppies as test fish, was developed. A toxic compound isolated from young derris roots was found to exist only in roots less than 3 months old. This may be a precursor of rotenone. The use of a Waring Blender for determining total chloroform extractives gave the same degree of accuracy as the standard method and shortened the time needed from several hours to 5 minutes. A collection of 46 tropical plants of possible insecticidal value is mentioned. **Cinchona:** The only satisfactory method of vegetative propagation devised has been the rooting of tip cuttings from relatively young shoots. A survey of insects attacking cinchona was completed and recommendations made for controlling them. **Vegetables:** The results of tests of varieties commonly grown in the southern U.S.A., Puerto Rico and Hawaii are being published. **Mangoes:** Trials indicated that tongue grafting, although difficult to perform, gives the highest percentage success. The use of lanolin stimulates new growth of scions. **Plant introduction:** The station maintains one of the largest collections of tropical plants in the Western Hemisphere. **Weed control:** The 2 most satisfactory weed killers tested were Dow contact herbicide and an oil emulsion fortified with butyl phenol. Other trials indicated that a combination spray of 2,4-D plus Concentrate 40 and 2,4-D plus an oil emulsion fortified with Santophen 20 is more effective than the unselective herbicide used alone. **Bamboo production:** Trials indicate that certain species can be propagated from branch cuttings, preferably leafless. The treatment of bamboo culms with DDT is reported to give permanent control of the bamboo powder-post beetle. The bamboo *Sinocalamus oldhami* is highly resistant to this pest.

2330. QUEENSLAND.

633.61(943)

47th Annual Report of the Bureau of Sugar Experiment Stations, 1947, pp. 53.

The following items are taken from the Director's report, which is followed by divisional reports, including those on soil technology, seedling propagation, entomology and pathology, mill technology and the work of the field staff. The usual sugar-cane breeding work was carried out at Meringa and the resulting seedlings raised in four districts. The varieties Q28 and Trojan displaced P.O.J.2878 and CO.290 for second and third places amongst commercial

varieties planted. Queensland-bred varieties provided 42.5% of the crop. The trial of a mobile hot-water tank for the treatment of sets to control chlorotic streak has been satisfactory. Tests of mercurial fungicides for the treatment of sets indicated the advantages of this treatment when planting is done in bad weather. Experiments to find satisfactory green manures and to test hormone type herbicides are reported. The report on seedling propagation includes lists showing crosses made in 1947 and varietal composition and distribution of the 1946 crop.

2331. TANGANYIKA. 633.526.23 + 635.25(678.2/9)

Annual Report of Department of Agriculture Tanganyika, 1945, 1948, pp. 147, S. 5.50.

Experimental work, pp. 29-37. **Sisal:** Records from field trials indicate that the total number of leaves produced by a sisal plant (aver. 220) does not vary widely whatever the treatment. With generous spacing and freedom from cutting the figure tends to fall to about 210 leaves, while with closer spacing and early or frequent cutting the figure rises to about 230. The original spacing trial has provided striking results. Both total fibre yields per cycle and the longevity of the sisal are closely related to the population of plants per unit area. Plots having 10,000 plants per hectare have yielded over 30 tons fibre per hectare and the sisal has lasted ten years. The cutting trials proved beyond doubt that postponement of the initial cutting to three or four years is attended by considerable loss of crop. If begun at two years, higher total yields are obtained as the plant tends to produce more cuttable leaf, and the later cuttings have better percentages of extracted fibre. Differences between cutting cycles were not so pronounced. All the experimental data point to the total number of leaves harvested per unit area being a cardinal factor affecting yields. Increased leaf size does not compensate for fewer leaves cut. **Onions:** The main conclusions drawn from experiments in the Northern Province were: The Chagga method of cultivation on flat beds gave higher yields ($6\frac{1}{2}$ tons per acre) than any other method tried. The Chagga custom of spacing the onions very close together gave the highest yields per acre, but reduced the size of the onions. The application of Shs. 37/- worth (2 cwt.) of sulphate of ammonia per acre raised the value of the crop by Shs. 302. With sulphate of ammonia yields were about 10 tons per acre; without, 5 tons per acre.

2332. TRELAWSNEY.

633.71(689.1)

Annual Report Trelawney Tobacco Research Station for 1947, being *Publ. Tobacco Research Board. S. Rhodesia*, 11, 1948, pp. 56.

Agronomy: The results from rotation and compost trials with tobacco are described and discussed. **Cultural and variety trials:** The results from the variety, spacing and topping trial (in its third season) are summarized, the indications being that spacing and topping had affected all three varieties tested in a similar manner. The optimum spacing appears to be about $3\frac{1}{2} \times 2$ ft. **Breeding and selection:** The results from 5 trials are described, including a test of new varieties derived from crosses and two comparisons of the progeny from single-plant selections. **Soil insect pests:** Results of trials with Gammexane and DDT are reported. Experiments aimed at altering the soil insect population by adjusting times of ploughing were continued.

Chemical investigations: The results from spraying tobacco with copper sprays plus various additions (NPK and trace elements) are recorded. Four commercial root stimulants (plant hormones) tested had no significant effect on stand or yield. Calcium cyanamide (1 lb. per sq. yard) gave excellent control of weeds in seed-beds, but inhibited growth of tobacco seedlings by raising soil alkalinity to toxic level. Calcium cyanamide was ineffective in controlling eelworm. Interesting results are reported and discussed from experiments laid down to test the chemical effects of compost on the cured leaf.

Thermal efficiency investigations: These are

NOTES ON BOOKS AND REPORTS

reported under two heads: (a) electric curing, and (b) heating and temperature recording apparatus. *Miscellaneous experiments*: Gas producers for heating tobacco barns; tests of a light, portable, low-pressure boiler, and a humidifier, suitable for tobacco growers; oil heating of barns.

2333. AGRICULTURAL RESEARCH ADMINISTRATION [U.S.A.]

63(73)

*Report of the Administrator of Agricultural Research 1947.** U.S. Department of Agriculture, Washington, 1948, pp. 361, 60 cents.

A short introduction, which briefly reviews the year's work and the progress of long-time research, is followed by the reports of the various Bureaux, including the following:

HOWARD, L. B. 664.85 + 664.84
Report of the Chief of the Bureau of Agricultural and Industrial Chemistry, pp. 9-64.

Amongst the many research projects reported are the following: The extraction of vitamin C from "English" walnuts—immature nuts contain 25-30% vitamin C (on dry-wt.) and hulls from ripe nuts 3-5%; the isolation of pure crystalline tomatin, an antibiotic in tomato leaves; increasing the insecticidal value of nicotine by the addition of synergists, e.g. phthalonitrile; tracing the path of a synthetic growth regulator (2,4-D) in growing plants by means of radioactive iodine; the development of a process for recovering, in essence form, the volatile flavouring constituents of apple and other fruit juices; the development of processes for hardening the slices of soft apple varieties in cooking; advances made in canning and freezing processes for fruits and vegetables; the dehydrofreezing process for fruits and vegetables (partial dehydration followed by quick freezing); the micro-organisms in frozen orange juice; the standardization of orange juice by adjusting the sugar-acid ratio; quick-freezing of orange purées; keeping qualities of fresh, unpasteurized, chilled orange juice; the preparation of frozen packs of grapefruit and orange segments; the isolation and identification of the constituents of grapefruit juice; the isolation from the lipid fraction of orange juice of substances that may contribute to deterioration; a new phosphorus-transferring enzyme in citrus fruits; losses caused by excessive salt in cucumber pickling.

SALTER, R. M. 633/635
Report of the Chief of the Bureau of Plant Industry, Soils, and Agricultural Engineering, pp. 267-346.

The following items are chosen from the many research projects reported. Apples: The introduced variety Sierguter was conspicuous in resisting heavy frost. Another introduction, Schöner aus Nordhausen, has flesh which retains its white colour after cutting. Peaches: A new, large, yellow freestone variety, Southland (a self of Halehaven) is promising as a commercial shipping variety for the South-east. Its cold requirements, for breaking the rest period, are low. Orange rootstocks: Rusk citrange promises to be a good stock, to replace rough lemon on high, thin soil. Tung: Close planting in the row and pruning to the vase form have given promising results. On nearly all soils potassium fertilizers improve the oil-content of tung. Onion: The variety Calred (Italian Red 13-53 × Lord Howe Island), which is resistant to downy mildew, is ready for release. Lettuce: Imperial No. 17 has given good results in weather too cold for other varieties. Cabbage: An improved type of Wisconsin All Seasons, resistant to yellows and mosaic, was released. Potatoes: Preliminary results suggest that aluminium ions may affect scab development. The new variety Marygold has an easily broken rest period so that treated tubers from a spring crop can be planted immediately for an autumn-crop. Other crops: Abstracts of work done on rubber, sugar-cane, tobacco,

pyrethrum, tung and sansevieria will be found elsewhere in this number of *H.A.* under their appropriate heads. Greenhouse pests: Hexaethyl tetraphosphate in aerosol at 1 g. per 1,000 cu. ft. gave "the finest control" of red spiders, aphids, mealybugs, mites and white flies. Winter-grafting studies: Fluorescent light "serves well" for callusing graft unions of several woody plants. DDT mixed with top soil has a depressing effect on the root and top growth of some fruits. There appears to be a danger of accumulating a toxic residue of DDT in soil. Radioactive elements: There is every indication that the use of these elements will make possible a rapid advance in the solution of both new and old problems of crop production and soil research. Urea-form, formerly called Uraform, promises to meet the long-felt need for a fertilizer that will provide N during the period when the plant needs it most.

2334. SECRETARY OF AGRICULTURE, U.S.A.

63(73)

Report of the Secretary of Agriculture, 1947.
U.S. Govt. Printing Office, Washington, 1947, pp. 152, 30 cents.

Mainly devoted to brief reviews on the economic position in the numerous fields of agricultural activity. Brief reference is made to the commercial aspects of research progress, e.g. fumigation with azobenzene and hexaethyl tetraphosphate against red spiders; the availability of carotene in food plants; the production of butylene glycol from apple and pear wastes; the dehydration of sweet potato vines as a substitute for alfalfa meal; the control of weeds with 2,4-D; new raspberry varieties; the storage of pears in an atmosphere free of ethylene gas; the reduction of aster yellows in carrots for seed; the new insecticide, Colorado 9, a bromo analog of DDT; a new hot-water treatment for potato chips to prevent browning and the scorched taste; the blight forecasting and warning service for tomato and potato growers; the new Teton potato, resistant to bacterial ring rot; the control of virus diseases of celery by destroying the wild host-plants with herbicides; spraying against cherry leaf-spot.

2335. HOCHSCHULE FÜR BODENKULTUR, VIENNA.

631.4
Die Bodenkultur, 1947, Vol. 1, H. 1, pp. 125.

Die Bodenkultur is published by the Agricultural College, Vienna, in co-operation with the Austrian Ministry of Agriculture. The journal will be the official organ of all workers concerned with agricultural research and related subjects. The first two numbers, which appeared in July and December, 1947, give the impression that papers of particular interest to the horticultural scientist may be expected. [See Abst. 1568 and 1569.]

2336. BUNDESANSTALT FÜR PFLANZENSCHUTZ, VIENNA.

632.1/9

Pflanzenschutz Berichte, 1947, Vol. 1, H. 1/2, pp. 32.

Pflanzenschutz Berichte is the organ of the State institute for plant protection in Vienna. In his introductory remarks the Minister of Agriculture announces that the re-establishment of the plant protection service in Austria has been completed and that in the new journal the institute will present the scientific results of its staff.

2337. WEST OF SCOTLAND AGRICULTURAL COLLEGE.

634/635(411)

Annual Report of the West of Scotland Agricultural College, Glasgow, 1946-1947, 1947, pp. 75.

The activities of the department of horticulture will be of interest to our readers. The selection of strawberries resistant to red core continues. Tomato diseases.—Steam sterilization of tomato house soil leads to a temporary increase in ammonia, which appears to favour botrytis infection; suggested measures for control include adjustment of pH for optimum nitrification, early use of nitrate of potash, use of potassium permanganate, use of lump charcoal. Breeding for resistance to *Cladosporium fulvum*

* See also 1674, 1849, 1860, 2014, 2052, 2152, 2154, 2184.

NOTES ON BOOKS AND REPORTS

continues. Variety trials are in progress with soft fruits and vegetables.

2338. ZANZIBAR PROTECTORATE. 633/635(678.1)
Annual Report of the Zanzibar Department of Agriculture for 1946, 1947, pp. 45, Shgs. 1.50.

Experimental work. *Cloves*: Results of manurial trials and the analysis of further leaf samples from healthy and "sudden death" clove areas are reported. The increase in the manganese content of leaves from healthy trees brought about by applying artificial manures without lime is considered noteworthy. Attempts were made, with little success, to root clove cuttings in closed propagators. Most of the cloves grafted on guava stocks died. *Coconuts*: Yields from manurial trials were inconclusive. *Pineapples*: Experiments with Smooth Cayenne were discontinued, as this variety was said to be unsuitably shaped for canning and appeared susceptible to rotting. California Red was introduced for trial. *Bananas*: A beginning was made in the establishment of a collection of local banana and plantain varieties, 25 of which are named. The Moko type is suited to the drier areas. In an examination of 22,000 banana plants for mosquitos only 190 larvae were found. *Kapok*: Yields from 4 varieties are reported, all low. *Oil palms*: Experimental yields from 1942 to 1946 are tabulated and the variations shown in the yield of bunches and fruit and in percentage of oil extracted in each month of 1946. *Cacao*: In buddings of Criollo on Forastero stocks approximately 60% were successful. *Coffee*: *Hemimelia vastatrix* defoliated *Liberica* coffee. This is said to be the first record of the fungus in Zanzibar. Yields of experimental plots of *Excelsa* and *Liberica* coffee for 1942/46 are tabulated. *Robusta* coffee plots were discontinued because of crop failures over 5 years. *Papaw*: A Hawaiian variety was found to yield twice as much latex as two local types tested.

2339. HILL, A. G. G. 635.1/7: 631.531
Seed production of European vegetables in the tropics.

Tech. Commun. Bur. Hort. E. Malling, 19, 1948, pp. 28, bibl. 41, 2s.

In this review are analysed the replies to a questionnaire sent to a score of countries. In many parts of the tropics, particularly at high elevations, seeds of many "European" vegetables can be produced economically, and often very rapidly. Where, moreover, the cropping season coincides

with the northern or southern winter it may be possible to speed up the process of plant breeding by growing alternate generations in the tropics. The ability of many long-day vegetables to set seed at high elevations near the equator, where the length of day is approximately twelve hours, suggests that certain ideas on the photoperiodic induction of flowering need revision. Future lines of work for the improvement of vegetables in the tropics are outlined and lists are given of the indigenous vegetable plants used in several countries.

2340. The following also have been examined:

a CARIBBEAN COMMISSION.

Report of the Caribbean Commission to the Governments of the French Republic, the Kingdom of the Netherlands, the United Kingdom, the United States of America for the year 1946, pp. 56 [received 1948].

b GORTER, A.

Scientific periodicals in the Netherlands. Centrale Organisatie T.N.O., The Hague, 1947, pp. 36, f. 3 (\$1.25).

c LOE, L. (NORWEGIAN COLLEGE OF AGRICULTURE).

Årsberetning fra Norges Landbrukshøgskole for budsjettåret 1 Juli 1944-30 Juni 1945. (Annual Report of the Norwegian College of Agriculture for the year 1st July, 1944, to 30th June, 1945.) Johansen and Nielsen, Oslo, 1947, pp. 136.

d 62nd and 63rd A.R. *North Carolina agric. Exp. Stat. for 1939-1940*, pp. 74 [received 1948].

e 64th, 65th, 66th, 68th A.R. *North Carolina agric. Exp. Stat. (Research and Farming 1941, 1942, 1944, 1945)*, pp. 83, 92, 111, 108 [received 1948].

f TRELAWSNEY.

A.R. Trelawney Tobacco and Research Stat. 1945, being *Publ. of Tob. Res. Bd. S. Rhodesia*, 9, 1945, pp. 87 [received 1948].

g Administ. Rep. Dir. Agric. Trinidad & Tobago for 1942, 1943, being *Coun. Pap. 57 of 1943*, pp. 16, 12 c. [received 1948].

h Bienn. Rep. agric. Exp. Stat., W. Virginia, 1944-46, being *Bull. 330*, 1947, pp. 48.